HYGIENE FOR NURSES

HYGIENE FOR NURSES

By

NOLIE MUMEY, M. D,

Lecturer in Hygiene, Chemistry, and Bacteriology, Logan H. Roots Memorial (City Hospital) Training School; Assistant Instructor in Surgical Technic, University of Arkansas; Resident Physician of City Hospital and a Member of the Visiting Staff, Little Rock, Arkansas

WITH 75 ILLUSTRATIONS

ST. LOUIS
C. V. MOSBY COMPANY
1918

Press of
C. V. Mosby Company
St. Louis.

TO MY LOYAL AND CONSIDERATE FRIEND
MY WIFE

THIS VOLUME IS AFFECTIONATELY
DEDICATED

PREFACE

The object of this small volume is to give to the pupil nurse facts on the subject without going into detail and burdening her mind with statistics that are not practical in her work.

A number of the subjects are but superficially covered, but are taken up in a way so that the nurse will get ready information without reading voluminous material. The subject is covered so that she can rely on it for information after her course of training is completed.

The facts are taken from some of the best authors on the various parts.

The author wishes to express his gratitude to various authors for the privilege of publishing in this work a number of illustrations taken from their books, for all of which credit is given in the text.

The author wishes to express his appreciation to Miss Lillian Kennedy for her assistance in the preparation of the manuscript.

N. M.

CONTENTS

CHAPTER X

BIBLOGRAPHY

GLOSSARY

ILLUSTRATIONS

HYGIENE FOR NURSES

CHAPTER I

EUGENICS—HEREDITY

Eugenics

Eugenics is a science which deals with the study and adaptations to conditions that will improve future generations. The aim of this science is to increase better people in each class, for the betterment of future generations and to repress the number of defectives in each class.

The word "eugenics" was coined by Sir Francis Galton, of England, in 1863. It does not merely imply sex hygiene; nor does it mean infanticide, but it does mean to improve the physical organism by proper mating and in this way check the propagation of defectives. To restrict marriages of the unfit seems impossible in the minds of the public, yet it has and is being done.

In Switzerland where goiters are numerous, there are a large number of cretins or idiots. They are feeble-minded, loathesome, helpless creatures, who are unable to look after their own toilet. These individuals were to be found everywhere; but the num-

ber has been greatly diminished by institutionalizing them, keeping the males and females separated, and in this manner preventing marriage and reducing the propagation of these unfit individuals.

A new race could be created in this manner in a generation if the sexes of defectives were segregated. At present the insane and epileptics are confined in institutions where they are cared for and prevented from marrying. A large number of them marry before being confined to asylums and bring on needless contaminations and unnecessary taxation for the upkeep of their progeny.

People become handicapped in society and in this manner fall into unfavorable surroundings for marriage, and are forced to marry some unfit individual and in this way bring on a burden to society of a defective offspring.

This offspring is determined by the make-up of the parents, the female brings a number of characteristics good and bad that are weighed against the characteristics of the male. If both sexes have some weak traits the child may inherit the weakness of the two, while, on the other hand, there may be enough good traits in one sex that will overcome the weakness of the other. The wrong traits in a child can not be corrected, although environment and education can do something, the essential part of an individual's make-up is born, not made.

One should not promiscuously choose a marriage

partner, but should consider the family tree of the parents and grandparents of both sides; as we inherit traits from great grandparents as well. It is obvious that eugenic control can only be obtained through the channels of heredity.

Heredity

By heredity is meant the qualities and diseases given off to the offspring by ancestry.

One of the most important facts in heredity is the law of Mendel, which shows that each individual is made up of two parts or traits, the dominant and the recessive. This is best explained by breeding guinea pigs of different colors. For example, if black and white are crossed the offspring will be black. The black seems to cover up the white, then the black is said to be dominant and the white recessive. The latter does not disappear, but shows up when the black offspring are crossed between each other; then the progeny falls into a group of black and a group of white. Three-fourths will be black, resembling the other grandparents. Some of the blacks will breed true black, some of them contain a mixture of the two.

The hereditary transmission of the color character of the dominant and recessive traits is well shown in Fig. 1.

These traits are separate factors and each act independently of the other. They do not blend and are

HYGIENE FOR NURSES

CHAPTER I

EUGENICS—HEREDITY

Eugenics

Eugenics is a science which deals with the study and adaptations to conditions that will improve future generations. The aim of this science is to increase better people in each class, for the betterment of future generations and to repress the number of defectives in each class.

The word "eugenics" was coined by Sir Francis Galton, of England, in 1863. It does not merely imply sex hygiene; nor does it mean infanticide, but it does mean to improve the physical organism by proper mating and in this way check the propagation of defectives. To restrict marriages of the unfit seems impossible in the minds of the public, yet it has and is being done.

In Switzerland where goiters are numerous, there are a large number of cretins or idiots. They are feeble-minded, loathesome, helpless creatures, who are unable to look after their own toilet. These individuals were to be found everywhere; but the num-

of the two, which will be a blue. If the blue is bred with the black the result will be one-half black, one-half blue, none will be white. The same thing occurs if blue is bred with white; none will be altogether different; half will blue, one-fourth black, one-fourth white, as is shown in the accompanying illustration.

The hereditary transmission of traits is best un-

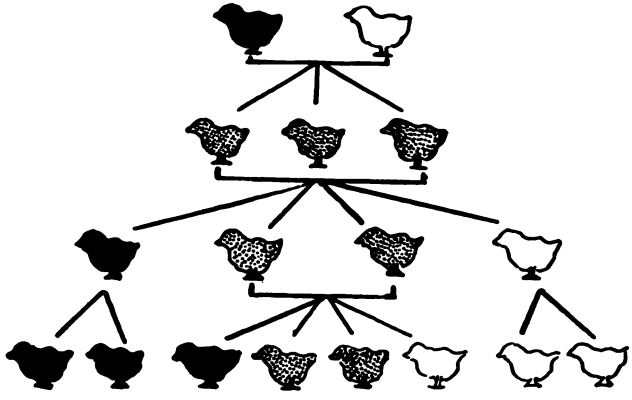

Fig. 2.—Diagram showing color heredity in the Andalusian fowl. (Kellcott.)

derstood by tracing back a family for a few generations, seeing what the offspring will be. One of the best illustrations of this is the Jukes family, which in five generations numbered about twelve hundred people, including those that married into it. The origin of the family was from five daughters of a lazy fisherman. Three hundred died while young, the remaining three-hundred and ten were paupers, half of the women were prostitutes, sixty were

thieves, one hundred thirty were criminals, seven were murderers, ten learned a trade in prison, four hundred forty were physical wrecks from various diseases. A large number of families have been traced back in this manner and it has invariably been shown that where the unfit have mated all the offspring have been of the parental type; while, on the other hand, noted families have been traced back and the progeny have all been people of a scientific trend or who have chosen professional careers.

Hereditary Diseases

We must not confuse the transmission of diseases with tendency to certain diseases: formerly a large number of diseases were thought to be hereditary, but the list has been greatly revised until there are but few true hereditary diseases, and large percentage of them are acquired through hereditary tendencies. In some cases we have a congenital transmission of a disease, where the infection is transmitted through the placenta as in syphilis, measles, and smallpox.

One interesting fact concerning syphilis is that a woman who has given birth to a syphilitic child develops an immunity and can not be infected by it, while on the other hand it might infect a nurse from handling it. The mother can give birth to such a child without showing any evidence of the disease herself. This is known as Colles' law.

Deaf Mutism.—Deaf mutism is a recessive defect and shows in a large number of the cases where deaf persons marry their blood relations. When cousins marry, who are from deaf stock, about one-fourth of the offsprings will be deaf. One instance where the intermarriage was nephew and aunt about seventy-five per cent of the children were deaf.

Hemophilia.—Hemophilia is a good example of a hereditary disease that is sex-limited. It is a condition in which the blood does not clot or coagulate, persons suffering from this are known as "bleeders," the disease is transmitted by the females to the males and is never transmitted by the male members of the family.

Color Blindness.—Color blindness, a condition in which the individual's ability to distinguish the different colors is diminished, is more common in men than in women. The male only transmits this condition to his daughters and never to his sons. The daughters will not be color blind provided the mother is normal, yet she will transmit it to half of her sons. The daughter to be color blind must receive these traits from only one parent.

Gout.—Gout is a very painful disease characterized by pain in the joints and chalky desposits of uric acid in various parts of the body. It runs in families and is transmitted hereditarily in about 60 per cent of the cases.

Polydactylism.—Polydactylism is a condition where an individual has supernumerary fingers or toes. This defect may be transmitted through several generations.

Epilepsy.—Epilepsy is a condition that is characterized by fits, loss of consciousness and convulsions. It has been produced artifically in guinea pigs and transmitted through several generations. In man about 40 per cent of the cases are transmitted by heredity, some claim a lower percentage.

Imbecility.—Imbecility or feeble-mindedness is inherited because there is an absence of some factor or determiner. There is no case on record where two imbecile parents produce normal children; they are feeble-minded offspring.

CHAPTER II

HYGIENE OF PREGNANCY, INFANCY, AND PUBERTY

Pregnancy

Exercise.—Every pregnant woman should spend at least two hours daily in out-door exercise. This is usually impossible during the early months of pregnancy on account of morning sickness, nausea, and the other discomforts. Nausea is perhaps nature's aid which demands rest and not exercise.

Moderate out-door exercise is very beneficial and if taken without much fatigue will put the women in good condition for labor. The best form of exercise is walking in the open air. If the weather will not permit this, some exercise should be taken on a porch or in a well ventilated room. Games and sports that require a great deal of energy should be avoided. Exercise is invigorating and stimulates the excretory organs to activity, the heart's action is increased; which results in more blood being sent to all parts of the body promoting better digestion and cheerfulness.

A woman who is active in her household duties will not need to walk one hour in the open; but on the other hand will need one hour of rest. As a usual thing all pregnant women are more or less

worried over their condition and need some diversion of mind such as is obtained out of doors. The passive form of exercise is very good, such as motoring or driving; if it causes backache and a feeling of weight in the pelvis it should be forbidden.

Clothing.—Clothing differs according to the season and the climate and it is used to keep the body warm and maintain an even circulation. The clothing of a pregnant woman should be loose and not be binding around the waist, breast or limbs. Garters should not be worn for they cause varicose veins. The skirt and waist should be fastened together at the belt and the dress hung loose from the shoulders. Corsets can be worn in the early months of gestation, but can not be used when the abdomen and breasts enlarge. Maternity corsets, loose corset-waists, or corsets with the staves removed are very comfortable to women who have been accustomed to wearing corsets. In multiparous women, or women who have borne children, the abdominal wall is relaxed and needs support; some comfortable means should be used for their benefit.

Diet.—The diet of a pregnant woman need not differ from the diet she has been accustomed to in the early months. She should not eat highly seasoned foods, or foods that cause distress or discomfort. Certain rules regarding the diet in the latter months of pregnancy should be followed out. Foods that

are easily eliminated should be eaten, for the excretory organs have double work to do, they must throw off the waste products of the unborn child as well as those of the mother. Liquids should be used in large quantities and foods that cause the accumulation of a large amount of waste material should not be used. Milk is an excellent liquid diet for the pregnant woman and is very beneficial during lactation if the habit is formed during pregnancy.

Fruits and vegetables are very good foods from the fact that they are laxative in nature and the pregnant woman has a tendency to constipation due to the increase in size of the uterus and the consequent pressure on the sigmoid and the rectum. Apples, pears, oranges, figs, pineapples, grapes, grapefruit, prunes, onions, tomatoes, peas, beans, celery, lettuce, cabbage and turnips serve the purpose well where laxatives are indicated.

A theory has been advanced that the weight of the child may be controlled by putting the mother on a restricted diet during the last three months of pregnancy, and that a diet poor in carbohydrates and fluids lessens the weight of the child. (Prochownik's Theory.)

Teeth.—The teeth are more prone to decay during pregnancy than at any other time, from the fact that the fetus demands an increase in calcium salts, which is supplied by the bones and the teeth. Vomiting and eructation will cause decay due to the hydro-

chloric acid of the stomach, therefore the teeth should be well brushed after each meal and after vomiting or eructation of fluids. A dentist should be consulted early in pregnancy so that all bad conditions can be corrected.

Fig. 3.—Proper position of mother while nursing child. (From Reed.—*Obstetrics for Nurses.*)

Breasts.—Every mother is expected to nurse her child. A great deal of attention should be paid to the breasts as well as the position assumed while the child is nursing. During the latter months of pregnancy the breasts should be bathed daily with a saturated solution of alcohol and boric acid. This hardens the nipples and acts as a good antiseptic. If the nipples are retracted they should be pulled daily in order that they come out so the baby can suck them. The care of the nipples should be begun

about six weeks before labor. There are many varieties of imperfect nipples, all of which tend to make nursing more difficult, and form an avenue for in-

Fig. 4.—Examples of imperfect nipples. (From Reed.—*Obstetrics for Nurses.*)

fection. The baby should be put to the breasts about twelve hours after delivery, and every two or three hours thereafter. The act of suckling is necessary to the mother and the baby as it not only teaches the baby to nurse, but causes the uterus to contract to its normal size, and stimulates the secretion of the breasts. During the first three or four days the baby does not get any milk. It is colostrum, a substance which stimulates the intestines of the baby and clears it of the contents that were there at birth. If the breasts are emptied at regular intervals they

will not cake, for the condition is very annoying to the patient and to the nurse. A breast binder should be applied, for the expansion of the chest will give

Fig. 5.—Breast binder. (From Reed.—*Obstetrics for Nurses.*)

the breasts a gentle massage. The nipples should be bathed before and after nursing with some antiseptic solution such as boric acid, alcohol, etc. If caking

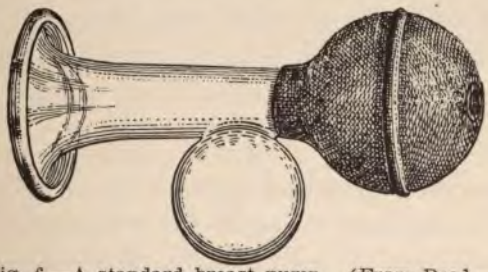

Fig. 6.—A standard breast pump. (From Reed.—*Obstetrics for Nurses.*)

should occur, hot applications and emptying are the best things that can be done. A standard breast pump should be used.

The Infant

Newly Born.—After the baby is born the eyes should be bathed with a boric acid solution and then two drops of a 2 per cent solution of silver nitrate should be instilled into each eye (Crede's solution). A 25 per cent argyrol may be used instead of Crede's solution.

The body of the baby should be oiled with either liquid albolene, olive oil, or vaseline, and then bathed to remove the vernix caseosa, which is a cheesy-like substance that covers the body of the child at birth.

The cord is then dressed preferably with sterile talcum powder, which dries the cord and will not preserve it as does boric acid and alcohol. An abdominal binder is then applied over the stump, and the baby is put in a crib and kept warm by means of hot-water bottles or other contrivances. If heat is not available the infant may be placed in bed with its mother; otherwise it should not occupy the same bed.

Skin.—Skin eruptions are very common in the young infant, because of its delicacy and the change of temperature with the various irritations. Cleanliness is the first step in the prevention of these eruptions; soap and rubbing should be avoided. The use of some bland powder in all the folds of the skin is commendable.

Eyes.—The eyes should be cleansed daily for the first few days with a saturated solution of boric acid at the time of bathing. In this way the eyes can be watched for any infection and at the same time take care of the irritation that is caused by instilling the Crede's solution.

Mouth.—The mouth should be watched closely for ulcers as thrush, cancrum oris, and etc. It should be cleansed daily with sterile water and a soft cloth; using very little friction.

Genital Tract.—The genital tract in both sexes is a source of a great deal of trouble. In the male a long adherent prepuce with adhesions may cause convulsions or enuresis. The glands should be retracted and annointed with vaseline until the adhesions disappear.

In the female the only attention that need be given is cleanliness; for infections of the bladder from the anus are common and frequently ascend to the pelvis of the kindney causing a pyelitis.

Nervous System.—During the first two years of an infant's life the brain grows more than any other organ of the body; so normal development requires rest and not excitement during this period. The child should not be handled roughly by tossing up in the air or frightened in any way.

Sleep.—For the first few days of an infant's life

it sleeps nearly all the time, waking only from hunger or discomfort. The child should not be allowed to go to sleep holding the nipple, neither should it be rocked to sleep. It should occupy a separate bed from the mother and be awakened after two or three hours of sleep for each nursing, as by doing this a regular habit is formed.

Exercise.—Exercise is very important to the young infant and it must have certain amount for growth and development, which is obtained by crying, and swinging arms and limbs.

Bathing.—For the first few months the bath should be short and the temperature 98° F. The body should be dried gently without rubbing. If no reaction occurs after a bath, it is an indication of low vitality and the bathing should be stopped.

Puberty

The rationale of hygiene during the period of puberty must be based directly upon the individual's understanding of the physiologic changes that are taking place, which should be taught by the strict guidance of intelligent parents; for during this period the future of the individual is determined.

All parents or teachers, who have the care of growing children should be qualified to teach them about their reproductive organs; and girls should be

taught of the menstrual flow before it begins. There should be no secrecy about reproduction; otherwise all information will be gained through undesirable sources, such as servants, indiscreet companions and flashy literature. The instruction should be given in a way that it will not improperly direct the attention of sexual things.

Exercise.—A few hygienic measures begun early in childhood before puberty will promote mental and physiologic development. Exercise is one of the greatest needs if taken in the right manner. Games and mild gymnastics are of the right kind. Strenuous exercise should be avoided in pale, anemic girls or those who have some cardiac lesion. Working in the open air and passive forms of exercise are good.

The home employment should not interfere with exercise, such as long hours at the piano or the sewing machine. This is very objectionable from the standpoint of posture and confinement.

Sleep.—A certain amount of sleep is required, the minimum amount being from eight to ten hours, in a well-ventilated room with simple comfortable furnishings.

Clothing.—With the advent of puberty the development of the woman begins, and the dress is changed to suit the growth. Tight corsets, tight skirts and improperly fitting shoes, should be

avoided. The fact that one must keep in style is responsible for poorly fitting clothing from a hygienic point of view. The average shoe worn is too small and altogether out of shape.

CHAPTER III

THE CAUSES AND TRANSMISSION OF DISEASE

Causes

The causes of disease are known as the "etiology," and may be divided into direct and predisposing causes.

DIRECT CAUSES

1. Physical, as heat and cold, atmospheric pressure.
2. Mechanical, as injuries.
3. Parasites.
4. Bacteria.

PREDISPOSING CAUSES

1. Heredity.
2. Age.
3. Sex.
4. Race.
5. Occupation.
6. Food.

Physical.—Extreme heat such as is endured by stokers and bakers or individuals engaged in work where they are confined to high temperatures suffer

from heat exhaustion and sunstroke. The heat may be enough to cause burn of the part and in that way bring about disease.

Cold or low temperature, may cause a freezing of the part and result in a permanent damage caused by the injury done to the blood supply.

Atmospheric pressure is diminished as in ascending high altitudes, it causes a disease known as mountain sickness, which gradually disappears when the individual becomes accustomed to the pressure. If the pressure is increased, as in divers, or caisson workers, it causes a disease known as "caisson disease."

Mechanical.—These forces affect changes in the body according to the extent of severity and the duration; for example, if pressure is continued it will cause an atrophy or a wasting of the part. Pressure from a shoe, causes a hyperemia which stimulates the overgrowth of epithelial tissue and causes corns. The body may become injured from force by a blunt object causing a contusion or injury to the internal organs. An object may tear the tissues causing a laceration, or, on the other hand, if it be a sharp object it will cut the tissues; all of which form portals of entrance to bacteria and in this way cause infection.

Parasites, Bacteria.—These alone are responsible for all of our diseases and are too numerous to tabu-

late, but will be considered under their respective heads.

Heredity.—Heredity plays an important part in the predisposition of diseases as has been shown in Chapter II.

Age.—Age has an important influence in the occurrence of certain diseases, the greatest predisposition occurs early and late in life; for example, young children who are not exposed to the weather and who do not come in contact with a large number of people are not liable to the diseases of adults; while, on the other hand, they are predisposed to gastrointestinal disturbances and some of the infectious diseases. In early life women begin to suffer from the complications of childbirth, while the men become exposed to veneral diseases. In middle life one is predisposed to malignant growths, as carcinoma or sarcoma; beyond this stage one is liable to the various degenerative changes in the various parts of the body.

Sex.—Sex plays an important part in the predisposition of certain disease as a result of anatomic changes and social conditions. Before puberty there is no marked difference in the diseases peculiar to either sex. Women suffer from the various diseases of the reproductive organs. Men suffer from disease that are peculiar to the social conditions, as exposure to the weather, overwork, etc.

Race.—Race plays but a little part in the predisposition of diseases. Some races are, however, immune from certain conditions; for example, the negro is immune from yellow fever, Chinese from cholera and the Jews from tuberculosis. The susceptibility of a race is perhaps due to environment; for example, the Indian who has led an outdoor life soon falls the victim of tuberculosis when housed up.

Occupation.—Certain classes of work predispose individuals to diseases, as plumbers and painters who suffer from lead poisoning. People who inhale dust have certain changes in the lungs, as anthracosis. Soldiers and sailors or men who are exposed to extremes of weather are liable to have certain diseases.

Food.—Food predisposes to certain diseased conditions. An excess of food predisposes to obesity and digestive disturbances, while a lack of food predisposes to atrophy and starvation. The food may contain bacteria or parasites, or it may be unbalanced and cause such diseases, as pellagra and beriberi.

Transmission of Disease

Diseases may be transmitted in several ways and by various routes.

The most common ways of the transmission of disease are by one of the following:

1. Water.
2. Soil.
3. Food.
4. Air.
5. Discharges from the nose and throat.
6. Discharges from the alimentary tract.
7. Inoculation.
8. Carriers.
9. Insects.

Water.—Water conveys such diseases as typhoid fever, cholera, and dysentery, and becomes contaminated by either of the following ways as shown in the illustrations.

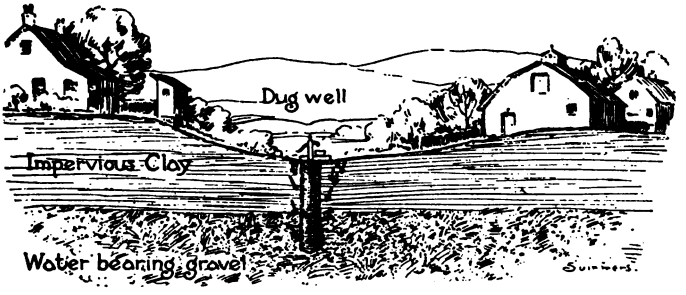

Fig. 7.—Surface contamination.

Soil.—The soil transmits such diseases as tetanus, typhoid fever, dysentery and hookworm. A very common way for soil pollution is shown in the illustration.

Food.—Food is responsible for such diseases as typhoid, tuberculosis and diphtheria. The most frequent means of transmission of these diseases is through milk.

Fig. 8.—Contamination by percolation.

Air.—Through the air a large number of diseases were supposed to be transmitted. Now we know that

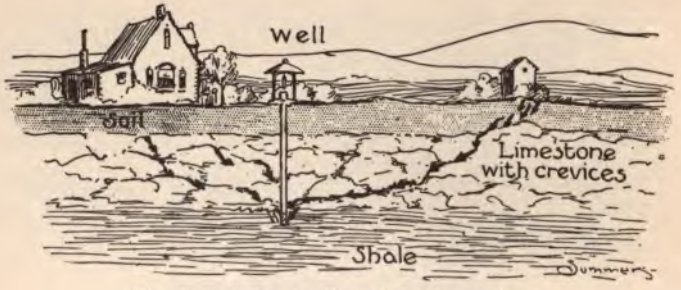

Fig. 9.—Contamination through crevices.
(From Gardner.—*Practical Sanitation.*)

there are but few air-borne diseases. Tuberculosis and measles can be transmitted through the air, if the crusts or the bacteria are deposited somewhere

and then dried. A patient could cough or sneeze and in this way spread droplets of saliva, which could contain the bacteria and so spread the disease through the air.

Malaria was at one time supposed to be an air-borne disease; but now we know that the air has nothing to do with the transmission of the disease.

Fig. 10.—A privy from which soil pollution is being spread by chickens and swine. (After Stiles.)

Discharges from the Nose and Throat.—Through the droplet infection or by coming in direct contact, the following diseases are transmitted:

1. Diphtheria.
2. Scarlet fever.
3. Whooping cough.
4. Lobar pneumonia.
5. Mumps.
6. Cerebrospinal fever.
7. Tuberculosis.
8. Influenza.

Discharges from the Alimentary Tract.—These discharges are emptied upon the soil, where they remain or find their way into some stream and transmit the following diseases:

1. Asiatic cholera.
2. Bacillary dysentery.
3. Hookworm.
4. Typhoid fever.

Inoculation.—This is a condition where the germ comes in direct contact with some abraded surface and in this manner conveys such diseases as:

1. Syphilis.
2. Gonorrhea.
3. Chancroids.

Carriers.—Carriers are individuals who harbor the germs of disease without showing any signs of the infection themselves and may harbor the germs for a short period or an indefinite length of time. Diseases that are transmitted in this manner are:

1. Typhoid fever.
2. Cholera.
3. Hookworm.
4. Meningitis.
5. Diphtheria.
6. Malaria.

Insects.—Insects are capable of transmitting a large number of diseases and each insect has its own special disease to convey.

1. Mosquito conveys:
   Malaria, yellow fever and dengue.
2. House fly conveys:
   Typhoid, tuberculosis, dysentery, diphtheria and cholera.
3. Tsetse fly conveys:
   Sleeping sickness.
4. Tick conveys:
   Rocky Mountain spotted fever.
5. Body louse conveys:
   Plague.

Mosquitoes.—There are several species, but we will only consider three, anopheles, stegomyia and culex. They all pass through four distinct stages: eggs, larva, pupa and winged insect. The growth is rapid and it requires from ten to twelve days for

complete development, which is influenced by the temperature, season and food. They breed faster during the summer months.

Fig. 11.—A typical breeding place for anopheles mosquitoes. (From Henson.—*Malaria.*)

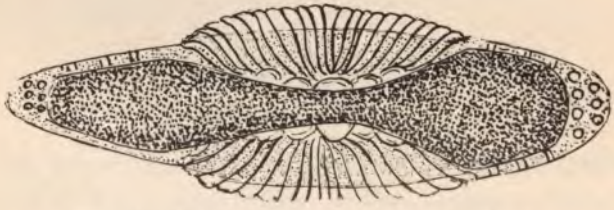

Fig. 12.—Eggs of anopheles. (After Ludlow.)

The female alone does the biting, owing to the fact that she requires human blood for the development

of her eggs. The male never bites, because he is a vegetarian and does not live on human blood.

The breeding places of these mosquitoes are tin cans, garbage pails, wells, flower pots, roof gutters,

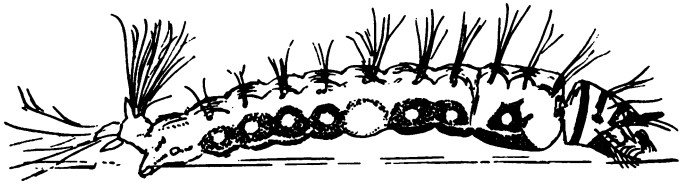

Fig. 13.—Half-grown larva anopheles. (After Howard.)

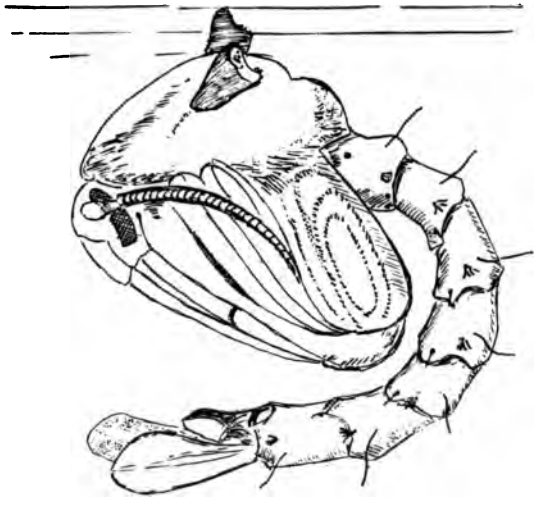

Fig. 14.—Pupa of anopheles (enlarged.) (After Howard.)

ditches, cess pools, hollow of trees, hoof prints and the quiet spots along the grassy banks of slow moving streams or lakes.

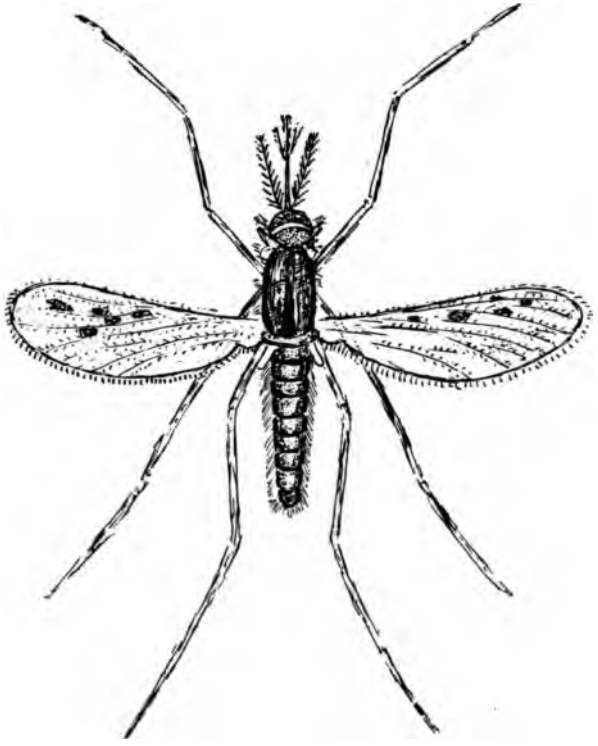

Fig. 15.—Anopheles maculipennis (female.) (After Auston.)

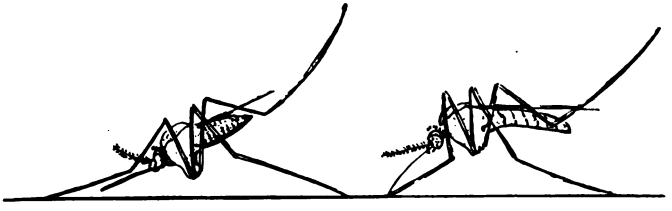

Fig. 16.—Resting position of anopheles (left), and Culex (right).

Anopheles.—Anopheles is the species that transmits malaria and breeds around grassy pools where stock like to drink and where there are but few fish.

The eggs are laid singly with a floater on each side, and are first white in color and soon become dark, absorb water and sink. In about two days the eggs pass into the larval or the wiggle-tail stage, each egg hatches from five to twenty larvæ.

Each larva has a body, head, thorax and a short breathing tube. It lies almost parallel with the surface of the water; so that part of its head and tube is out of the water and it feeds in this position.

These larvæ, or wiggle-tails, are found numerously in rain barrels and in about seven days they pass into the pupal stage.

The pupa stage lasts about three days then passes into the winged insect.

The anopheles mosquito is recognized by being brown in color and the palpi are as long as the prosboscis. They also have a resting position that is very characteristic and distinguishes them from other mosquitoes.

The resting position of the anopheles is about an angle of thirty degrees, with the proboscis and tail in a straight line.

Stegomyia Mosquito.—The stegomyia is the type of mosquito that transmits yellow fever. It breeds

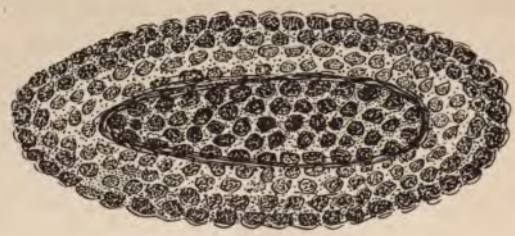

Fig. 17.—Eggs of stegomyia.

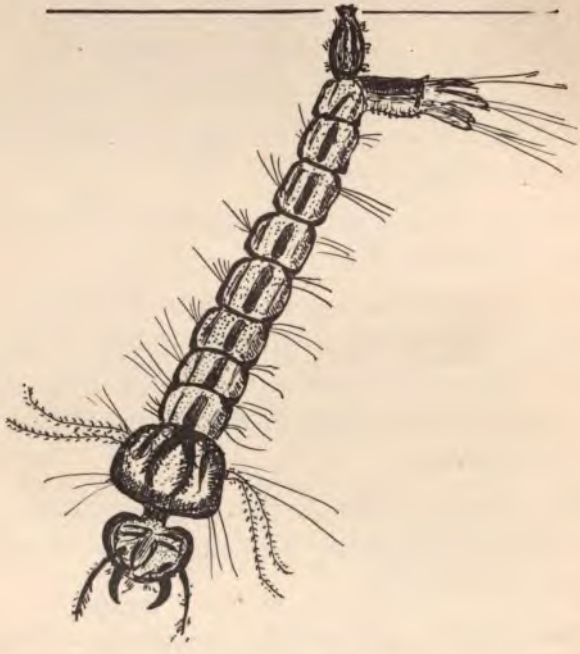

Fig. 18.—Larva of the stegomyia mosquito.

in standing water around the house and not in streams as does the anopheles. It passes through the four stages of development.

The eggs are laid singly and are not adherent; they soon become black in color. These eggs retain

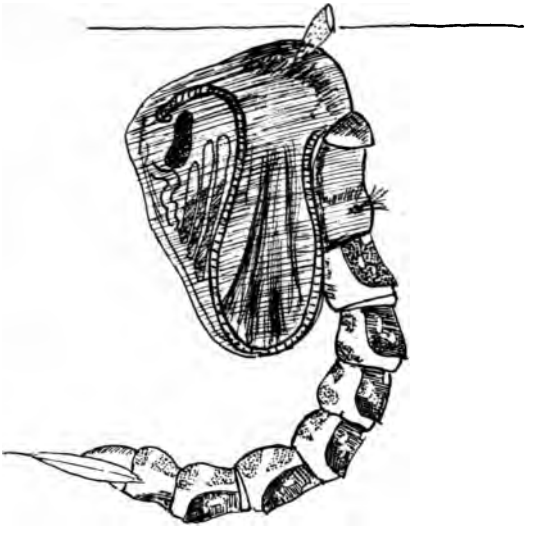

Fig. 19.—Pupa of stegomyia fasciata. (After Howard.)

their vitality a long time and are very resistant to dryness and freezing.

The wigglers, or the larvæ, of the stegomyia lie in the water with the head down at an angle of forty-five degrees. It has a barrel-shaped respiratory tube.

The pupa of the stegomyia is an air-breather and spends most of its time at the surface of the water. It has no mouth.

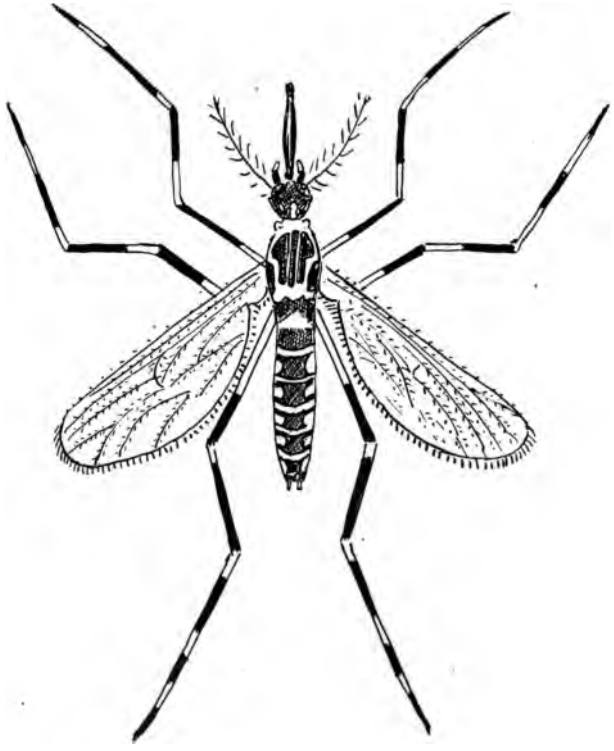

Fig. 20.—Adult female stegomyia fasciate. (After Howard.)

The winged insect of the stegomyia is about the average size mosquito. It has conspicuous silver stripes on its abdomen and thorax, with striped legs. The palpi are shorter than the proboscis and

have white lines on them. This mosquito likes to do the biting during the day time in contradistinction to the anopheles which are nocturnal in their habits.

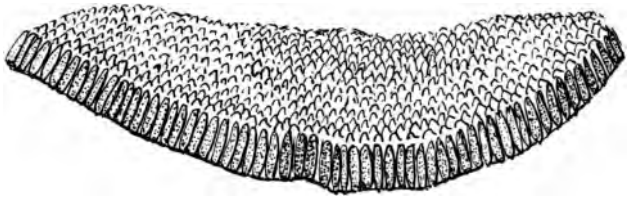

Fig. 21.—Eggs of culex pungeus. (After Howard.)

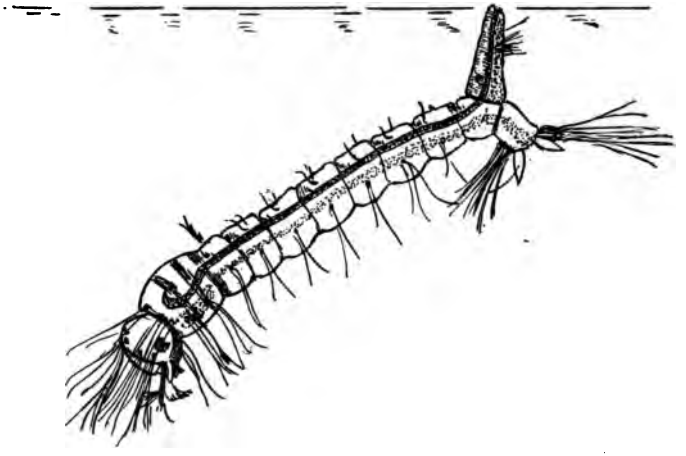

Fig. 22.—Half-grown larva of culex (enlarged). (After Howard.)

Culex Mosquito.—This mosquito transmits dengue, or break-bone fever. It breeds along the banks of still streams and passes through the four stages.

The eggs are laid in rafts on the surface of the water, side by side in long rows. Each one has a pointed top. There are from two-hundred to four-hundred in each batch and they are protected from wetting by a film of air.

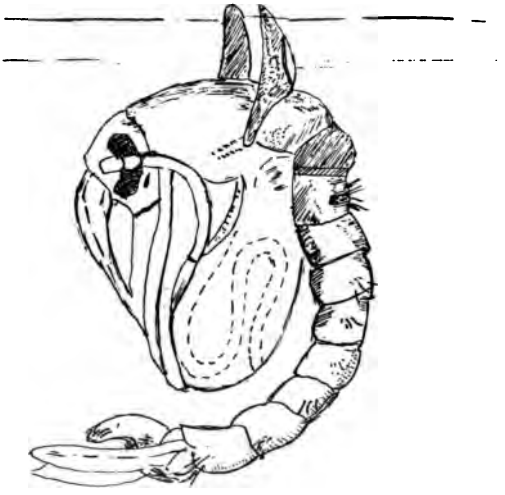

Fig. 23.—Pupa of culex (enlarged). (After Howard.)

The larva of the culex has a head, body, and a breathing tube, through which run two trachea that carry air to all parts of the larva. Its resting position is about the same as that of the stegomyia.

The pupa of the culex is all head and thorax, with a slender abdomen. It remains motionless unless disturbed; then it will swim rapidly with the aid of two large abdominal flaps. It will rise to the surface

of the water without exertion because of the fact that it is lighter than water.

The winged insect is about the size of other mos-

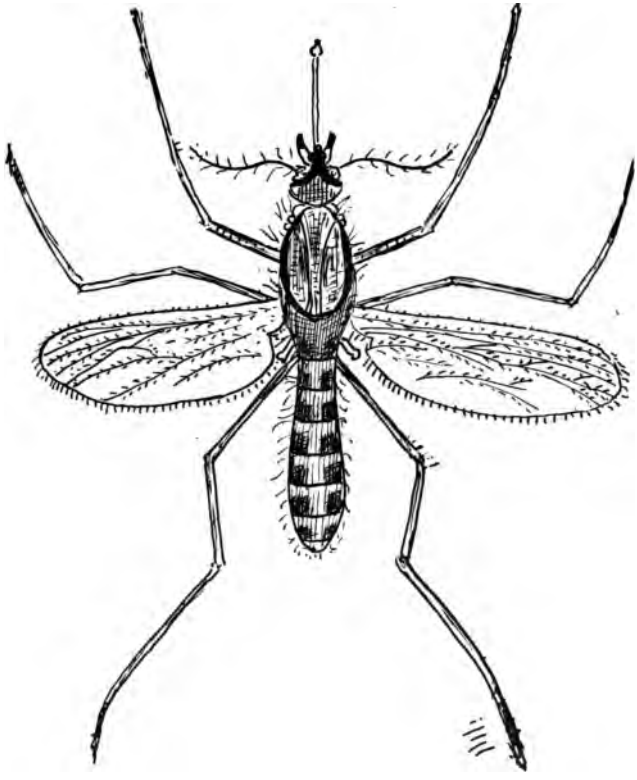

Fig. 24.—Adult female culex pungens. (After Howard.)

quitoes and has curved proboscis. Its resting position easily differentiates it from other mosquitoes. Its head, palpi and proboscis are not in line with the

remainder of the body, but rest in a humped position.

House Fly.—The house fly or musca domestica, breeds in manure piles, garbage heaps, carcasses of dead animals, and around poultry and hog pens. It

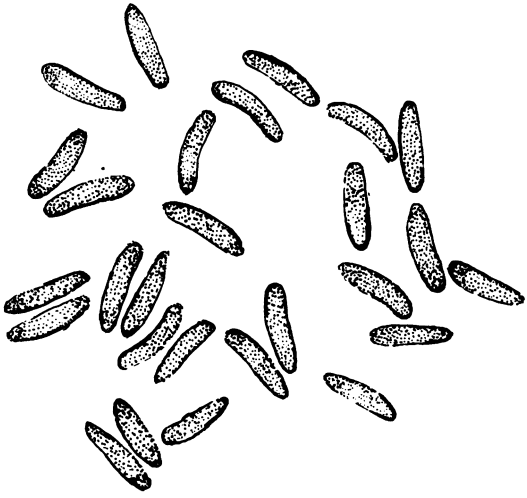

Fig. 25.—Eggs of house-fly.

has been estimated that a single fly at summer temperature in forty days, would produce eight hundred and ten pounds of flies, if only half of them lived, figuring that one thousand flies will weigh one ounce.

A fly will lay from one hundred to one thousand eggs every ten days. They pass through four

stages, eggs, larva, pupa and the winged insects. The egg stage lasts six to eight hours, larval stage

Fig. 26.—Larva of house fly.

Fig. 27.—Pupa of house fly.

lasts four to five days, and the pupal stage lasts about five days.

The maggot or the larval stage lasts about five days.

Pupa is in a hard brown case which opens about the fifth day and sets free a fly.

Fig. 28.—The winged insect.

The house fly or the musca domestica is responsible for the transmission of more diseases than any other insect.

Tsetse Fly.—The tsetse fly transmits sleeping sickness and breeds around the brush and the greens of pools where it can feed on the blood of

crocodiles. The larvæ remain in the body of the fly until they are developed; they are then dropped on the ground where they undergo transformation by burrowing in the soil.

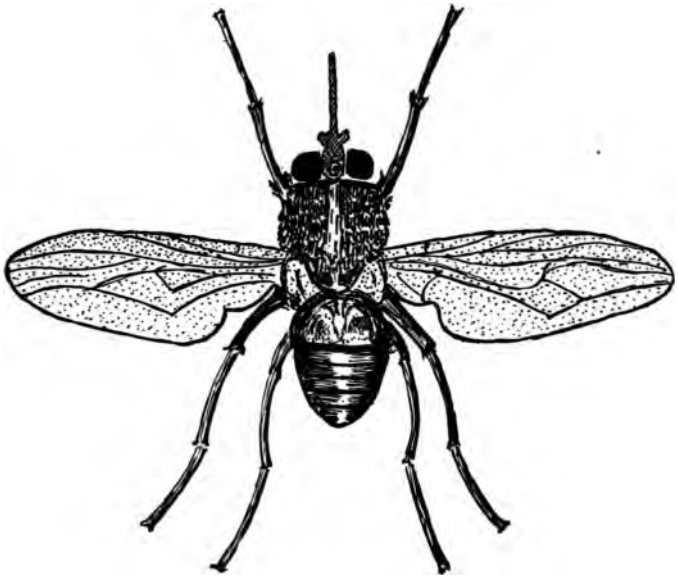

Fig. 29.—Tsetse fly. (Glossina palpalis).

Tick.—The tick transmits Rocky Mountain spotted fever and lives exclusively upon the blood of animals, and can be frequently seen hanging on the skin of animals where they are gorged with blood. They pass through four stages of development, the eggs are laid on the ground, the larvæ are small and

have six legs; they hang to some animal, gorge themselves with blood and then drop to the ground and become eight legged insects known as nymphs. These soon engorge with blood and pass into the adult stage.

Body Louse.—The body louse transmits typhus fever. They are flat elongated wingless insects, with a proboscis, which contains a stylet that is used for sucking blood which renders them dangerous. They do not travel much and walk side ways by means of short legs.

The eggs are laid in the clothing, or hair of the host, and hatch in from ten to fifteen days. There are three species found upon man and only one transmits disease.

1. Body louse, pediculus vestimenti.
2. Head louse, pediculus capitis.
3. Pubis or crab louse, pediculus pubis.

Flea.—The flea transmits plague from the rat to man. They are wingless insects and pass through four stages, eggs, larva, pupa and insects. The eggs are laid loosely in the hair or fur. In three to five days they develop into a slender yellowish larva; from eighteen days to three weeks they develop into the insect. The males and the females are both capable of biting and transmitting disease. They can jump from three to six feet.

The Indian rat flea is the one mostly concerned in transmitting plague, still it can be transmitted by the squirrel or the cat flea and the human flea. The disease is transmitted from rat to rat to man through it.

CHAPTER IV

DISEASES

Diseases That Are Conveyed by the Discharge of the Nose and the Throat

1. Diphtheria.
2. Scarlet Fever.
3. Whooping Cough.
4. Lobar Pneumonia.
5. Measles.
6. Mumps.
7. Influenza.
8. Cerebro-spinal Fever.
9. Tuberculosis.

Diphtheria

Definition.—An infectious disease characterized by a membrane-like formation on the mucous membranes of the throat.

Etiology.—Caused by the Klebs-Loeffler bacillus, which is transmitted, from person to person, by carriers, milk and from the discharges of the nose and the throat.

Period of Incubation.—Is from two to seven days.

Symptoms.—The disease begins with a feeling of malaise and a high fever, pulse one hundred to one

hundred and twenty. The throat begins to get red, and have the appearance of a grayish white membrane, which soon turns to a dirty gray color and is very adherent; bleeds on removal.

Prophylaxis.—The most important factor in the prophylaxis is isolation, which should be carried out in a well-ventilated room from which all unnecessary furnishings have been removed. There

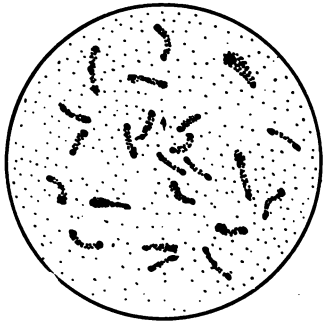

Fig. 30.—Diphtheria bacillus.

should be plenty of moist air in the room. The nurse and the physician should wear a gown over the clothing and keep their heads tied with a piece of gauze. The clothing, bed linen and dishes should be disinfected. Antitoxin should be administered, every two weeks if the disease persists. All throat disorders should be immediately treated with some antiseptic solution, and cultures made in suspicious cases for carriers; for a patient can carry the germs

six months or longer after the symptoms of the disease have disappeared.

Fig. 31.—Tonsillar diphtheria. (Courtesy of Dr. John Zahorsky.)

Scarlet Fever

Definition.—Scarlet fever is an infectious disease, which is characterized by a diffuse scarlet rash.

Etiology.—The specific organism is believed to be transmitted from the discharges of the nose, throat

and skin, it is claimed to be a modified streptococcic infection. It occurs in sporadic cases and in epidemics, most of the cases occurring before the tenth year.

Period of Incubation.—The symptoms have a sudden onset, with vomiting, high fever, dryness of the throat and flushed face. On the second day a scattered red rash appears and spreads rapidly over the body and soon has a scarlet hue. It may fade in two or three days or may last longer. Desquamation takes place with the shedding of large casts of the arm or leg.

Prophylaxis.—The spread of the disease is prevented by the attendants taking careful precautions, as wearing a gown and washing hands and face before leaving the room. Quarantine should be from six to eight weeks.

Whooping Cough

Definition.—Is an infectious disease, characterized by a cough, which ends in a whoop.

Etiology.—Whooping cough is probably caused by the Bacillus pertusis and is transmitted from person to person by the secretions of the nose and the throat; from fomites as trays, handkerchiefs and drinking cups. Cats and dogs may be the means of conveyance.

Period of Incubation.—The period of incubation is from seven to ten days.

Symptoms.—The disease usually begins with a cold and running at the nose and a slight cough, which gradually gets worse and develops a whoop. The whoop comes on with deep inspiration after fifteen to twenty short coughs and is followed by vomiting.

Prophylaxis.—The prevention consists of isolating the patients and not allowing them to ride on street cars, or go to church or theatres. The sputum and the clothing of the patient should be disinfected.

Lobar Pneumonia

Definition.—Lobar pneumonia is an infectious disease characterized by inflammation of the lung and high fever which terminates with crisis.

Etiology.—The disease is caused by the pneumococcus of Frankel. It is transmitted by discharges from the mouth, nose and throat, cups, thermometers or other contaminated objects. These organisms are always present in the saliva and if the body resistance is lowered, as in exposure to cold or alcoholism, the chances for infection are great.

Period of Incubation.—The period of incubation is not known, but it is very short.

Symptoms.—The disease usually begins with a chill, and a sudden rise of temperature, pain in the chest, which is accompanied with dry painful cough and increased respiratory movements. The patient lies on the affected side and has a flushed face. The sputum soon becomes tinged with blood and is very tenacious and will remain stuck to a pan if turned upside down. After the fever has persisted from five

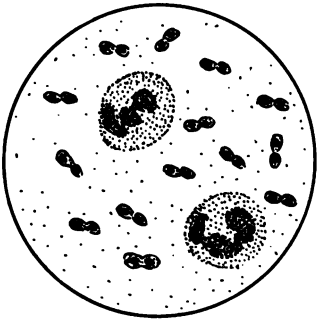

Fig. 32.—Pneumococcus.

to ten days the temperature drops suddenly (crisis) and the disease terminates.

Prophylaxis.—All patients with pneumonia should be isolated in a well-ventilated room and all the sputum should be disinfected. The patient should not cough or sneeze without holding something over the mouth. Trauma and exposure should be avoided for the germs begin to work when there is a lowered body resistance.

Measles

Definition.—Measles is an acute contagious disease which is characterized by catarrhal symptoms and a rash.

Etiology.—This is principally a disease of childhood and at times becomes epidemic. The germ is unknown, but is present in secretions of nose and throat and blood on the skin. May be conveyed by a third party through clothing, etc.

Period of Incubation.—The period of incubation is from seven to eighteen days.

Symptoms.—For the first three or four days, there are the symptoms of an ordinary cold. The fever gradually increases and at the end of the fourth day a rash appears, which looks like reddened flea bites. This usually begins on the face and spreads until there is a mottled appearance. In the mouth the Koplick's spots are to be found, which are white specks that are surrounded by a red zone. The desquamation of measles takes place in large flakes.

Prophylaxis.—The prophylaxis consists mostly of isolation. This should be carried out in a well-ventilated, sunny room. Precautions, such as wearing a gown over the clothing, washing the hands in antiseptic solution before visiting other children are of importance, for the disease can be transmitted in this manner.

Mumps

Definition.—Mumps is an infectious disease, which is characterized by swelling of the salivary glands.

Etiology.—The cause of the disease is from an unknown virus, which is very contagious and is spread from person to person.

Period of Incubation.—The period of incubation is from two to three weeks.

Symptoms.—The symptoms are high fever, and pain and swelling below the ear. The disease subsides in from seven to ten days.

Prophylaxis.—The prophylaxis consists of avoiding personal contact, for the virus is found in secretions of the nose and throat and may be transmitted in six weeks after the symptoms have disappeared. It is also contagious before the development of symptoms.

Influenza

Definition.—Influenza or la grippe is an infectious pandemic disease, characterized by depression, fever and inflammation of the mucous membranes of the nose and the larynx.

Etiology.—The disease is caused by a germ known as the Pfeifer bacillus and is transmitted from person to person.

Period of Incubation.—The period of incubation is from one to four days.

Symptoms.—The disease begins with fever and malaise and the symptoms of an ordinary cold (respiratory type). It may begin with nausea, vomiting and abdominal pain (gastrointestinal type). It may begin with headache and prostration (nervous type.)

Prophylaxis.—The most important factor in the prophylaxis is isolation of the patient, which can not always be practiced. The patient should not be allowed in public places as street cars, theatres, etc. A cough or a sneeze is sufficient to infect any number of people. The first case in a home should be isolated in order to prevent an epidemic. Patients should stay in bed during the febrile period, to prevent complications such as peritonitis and endocarditis. One attack does not immunize from future attacks, but predisposes to attacks of the disease.

Cerebrospinal Fever

Definition.—Cerebrospinal fever is an acute infectious disease, characterized by an inflammation of the brain and spinal cord. It may occur sporadically or in epidemics.

Etiology.—The disease occurs in mining districts and in barracks and tenement houses. Rarely does

more than one case occur in the same house. It is caused by the diplococcus intracellularis. In sporadic cases the causative organism may be either the streptococcus, pneumococcus, influenza or colon bacilli.

Period of Incubation.—The period of incubation is unknown. The disease may come on suddenly.

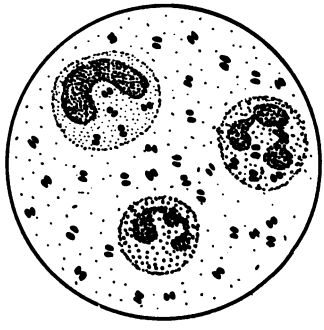

Fig. 33.—Meningococcus.

Symptoms.—The disease begins with a headache, fever and rigidity of the muscles of the neck with contraction, which causes the head to be drawn back. Noises cause irritability. In children there may be convulsions and delirium.

Prophylaxis.—The prophylaxis consists in isolating the patient and disinfecting the sputum, urine and secretions of the nose and throat. The throat should be sprayed with some antiseptic solution.

Fig. 34.—Patient actively ill six days with epidemic meningitis. She was apathetic but otherwise clear and responded to questions. Note the anxious expression; the retraction of the head; the dilated pupils; the right facial paralysis; right external strabismus, and the sordes on the teeth. (From Sophian.—*Epidemic Cerebrospinal Meningitis.*)

Fig. 35.—Boy of eleven, ill forty-eight hours with epidemic meningitis. He was actively delirious so that he had to be held for the photograph. Note posture. The head markedly retracted, back bowed. (From Sophian.—*Epidemic Cerebrospinal Meningitis.*)

Tuberculosis

Definition.—Tuberculosis is an infectious disease caused by the bacillus tuberculosis and is characterized by the formation of small, rounded masses, known as tubercles.

Etiology.—The disease is caused by bacillus tuberculosis and is transmitted by the air, or by droplet infection, such as coughing and sneezing. The germ

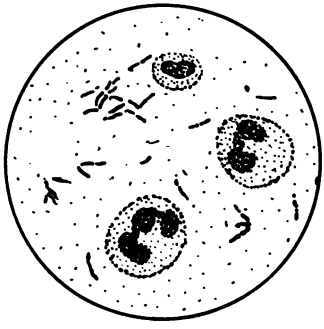

Fig. 36.—Tubercle bacilli.

may be taken into the mouth and in this way cause the disease. Flies, milk and water act as suitable agents for transmitting the disease.

Symptoms.—The onset of the disease may resemble typhoid or malaria, and may be sudden or gradual in character. The disease usually begins with a

pain in the chest, accompanied with a dry cough, which soon becomes mucopurulent in character. Night sweats and a rise of temperature in the evenings are important symptoms.

Prophylaxis.—One of the prime factors in the prevention of this great plague is the education of the public along the lines of the care and treatment of consumptives. Great care should be taken that the sputum is thoroughly disinfected, for it may harbor millions of bacteria. The best way of disinfecting the sputum is to collect it in paper cups and burn it, for the germ is surrounded by a fatty capsule, which is a protection against some of the germicides. One should not associate closely with tubercular individuals, especially in poorly ventilated quarters. Plenty of fresh air and sunshine are very important in the prevention. Great care should be taken of children, who are born of tubercular parents, for they inherit the tendencies, which render them more liable to the disease.

Diseases That Are Conveyed by the Alimentary Discharges

1. Asiatic cholera.
2. Bacillary dysentery.
3. Hookworm.
4. Typhoid fever.

Asiatic Cholera

Definition.—Asiatic cholera is an infectious disease characterized by severe purging and collapse.

Etiology.—The disease is caused by the comma bacillus, which is transmitted through water, or clothing that has become contaminated from the stools of cholera patients. It is also transmitted by carriers.

Period of Incubation.—The period of incubation is from two to five days.

Symptoms.—The disease usually begins with a slight diarrhea, accompanied with colicky pains in the abdomen and persists until the patient sinks into a stage of collapse. They become weak, cyanosed and have a subnormal temperature.

Prophylaxis.—The prophylaxis is very important and consists in isolating the patient and thoroughly disinfecting the stools and the linen. All foods should be thoroughly cooked and should be protected from flies. Water and milk should be boiled before using.

Bacillary Dysentery

Definition.—Bacillary dysentery is an acute infectious disease characterized by frequent bowel movements, with purge of blood and mucous.

Etiology.—The disease is caused by a bacillus of the Flexner-Harris type. It enters the body by the mouth and leaves by the rectum and is transmitted from man to man by food and flies. The amebic type of dysentery is chronic in nature is transmitted in the same manner and is caused by the entameba histolytica.

Period of Incubation.—The period of incubation is from one to two days.

Symptoms.—The disease usually begins with a sudden onset fever, abdominal pain and frequent mucous stools, which soon become bloody in character. The fever goes higher and the bowel movements become increased in number and death may occur on the third day.

Prophylaxis.—Cooking the food and boiling all water with protection from flies and the disinfection of the alvine discharges constitute the means of prevention.

Hookworm Disease

Definition.—Hookworm disease is an infectious disease characterized by malaise, anemia and retardation of growth.

Etiology.—This disease is caused by the Ankylostoma, duodenale (old world series) and the Necator Americans the (new world series). It is trans-

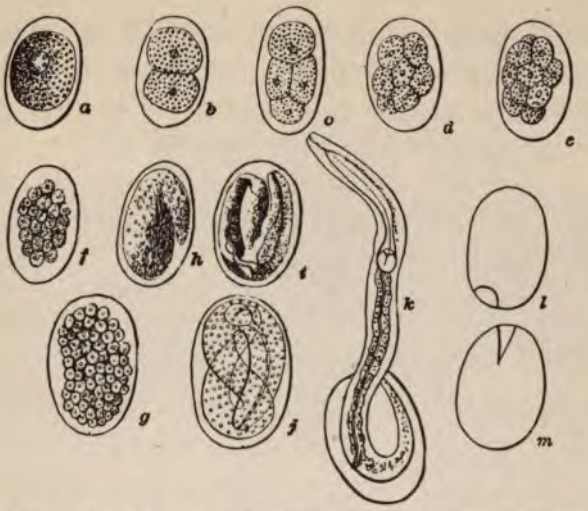

Fig. 37.—Embryology of the old world hookworm (ankylostoma duodenale) of man; *a, b, c, d, e, f, g,* segmentation of the egg; *h, i, j,* the embryo; *k,* a rhabditiform embryo escaping from its eggshell; *l, m,* empty eggshells. Greatly enlarged. (After Perroncito.)

Fig. 38.—Experimental hookworm infection. Shows confluent vesicle formation, with slight decrease of swelling. (From Dock-Bass.—*Hookworm Disease.*)

mitted principally through the skin; barefooted children come in contact with the larvæ, which produce what is known as ground itch. The larvæ are

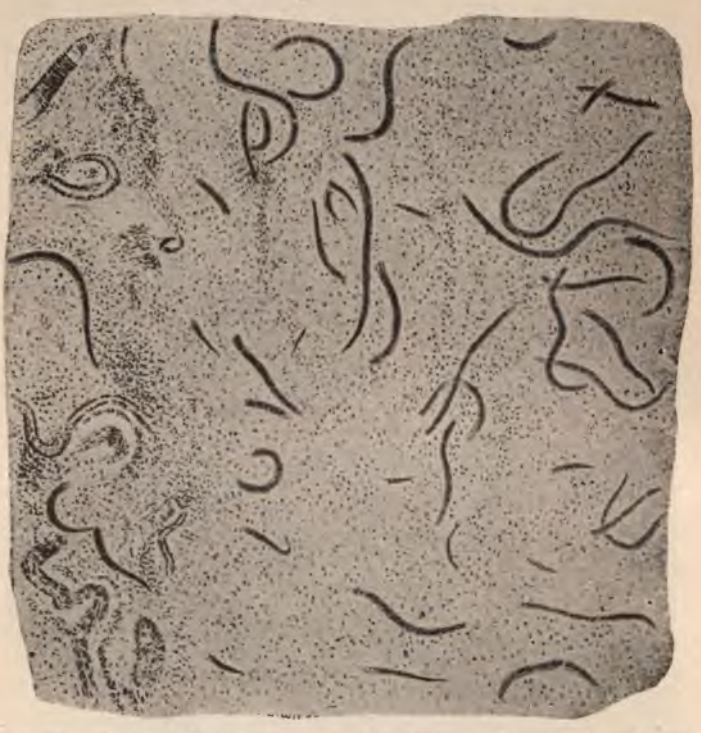

Fig. 39.—Section of skin as seen under the microscope, showing the hookworm larvæ crawling through the skin. (After Stiles.)

carried through the venous circulation to the lungs, where they pass up the bronchi to the trachea and then down the esophagus to the stomach and to the small intestines, where the worms grow and develop

by sapping the strength of the blood of the individual.

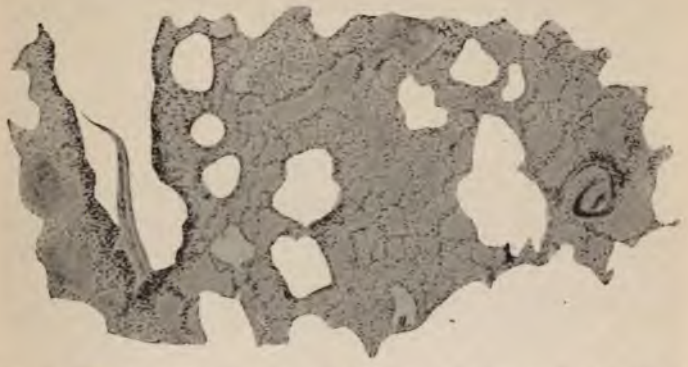

Fig. 40.—Two hookworm larvæ in the lungs. The one on the left is entering the bronchus. (After Stiles.)

Fig. 41.—Two larvæ in the larynx. (After Stiles.)

Period of Incubation.—The period of incubation is variable. Experimentation has shown that it

mitted principally through the
children come in contact with the
duce what is known as ground itch

Fig. 39.—Section of skin as seen under the
hookworm larvæ crawling through the

carried through the venous circulat
where they pass up the bronchi to
then down the esophagus to the sto
small intestines, where the worms

takes from forty-five to seventy-four days from the time the skin is infected until the eggs appear in the feces.

Symptoms.—In children we have a retarded growth and they are lazy and have no energy. In

Fig. 44.—Severe hookworm case; subject 16 years old. Emaciation: no edema. (From Dock-Bass.—*Hookworm Disease.*)

most cases there is anemia and the child may have a perverted appetite and eat dirt or chalk, etc. Adults present the symptoms of anemia and laziness and in some cases have severe abdominal pain simulating appendicitis.

Prophylaxis.—The prevention of this disease consists in preventing the soil from being polluted and by eradication of the parasite in man. Individuals should not go barefooted but should wear good shoes and stockings.

Typhoid Fever

Definition.—Typhoid fever is an acute infectious disease characterized by a general infection, with

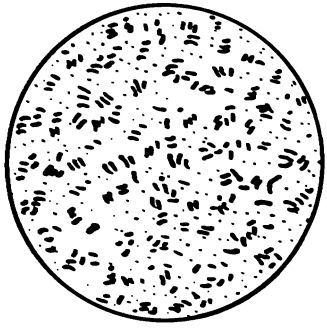

Fig. 45.—Typhoid bacilli.

ulceration and hyperplasia of the lymph follicles of the small intestines.

Etiology.—The disease is caused by the **bacillus** typhosus, which is transmitted by food, flies, **fingers,** fomites, water, milk and carriers.

Period of Incubation.—The period of incubation is from eight to fourteen days.

Symptoms.—The disease usually begins with a feeling of lassitude and nose-bleed and a fever which gradually rises higher each day until it reaches its acme. The pulse remains about the same and does not go up with the fever. Patient may become delirious. The fever lasts about three weeks and gradually comes back to normal, dropping lower each day.

Prophylaxis.—The patient should be isolated and a thorough disinfection of all discharges, dishes, and linen. Pure food, good water and milk supply with sanitary surroundings is the keynote to the prevention. Individual immunity is obtained through the administration of typhoid vaccine, which is given in three doses about seven days apart.

All suspected carriers should be examined and if found positive they should not be allowed to handle food or milk; for a large number of epidemics have been traced to this source.

Diseases That Are Conveyed by Insects

1. Malaria.
2. Yellow fever.
3. Dengue.
4. Trypanosomiasis.
5. Plague.
6. Rocky Mountain spotted fever.
7. Typhus fever.

Malaria

Definition.—Malaria is an infectious disease that is characterized by an intermittent fever and paroxysms at various intervals.

Etiology.—Malaria is caused by a parasite known as a plasmodium—Plasmodium vivax causes tertian malaria; Plasmodium falciparum causes estivoatum-

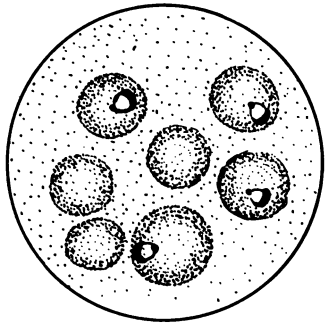

Fig. 46.—Malarial parasite.

nal malaria; Plasmodium malaria causes quartan malaria. These three forms are transmitted through the female mosquito as has been stated in a previous chapter.

Before a mosquito can transmit the disease it must bite an individual that has malaria, then a cycle of changes takes place in the body of the mosquito. After seven days the mosquito can infect an individual by biting. After a person is bitten by a mosquito

cycle of changes takes place in the blood stream. The small spindle-shaped (sporozoits) bodies pierce the red blood cells and they undergo several changes; some are left to preserve the life of the parasite and to spread the infection.

Period of Incubation.—The period of incubation is from three to thirteen days.

Symptoms.—There is usually an aching feeling and a tendency to yawn and stretch. The patient then begins to get cold and the chill comes on, which lasts from ten to sixty minutes. The skin gradually gets warm and then temperature begins to rise and in about three hours the fever and aching disappear.

In tertian malaria the paroxysms occur every third day. In quartan they occur every fourth day. In estivoautumnal the paroxysms are very irregular occurring every twenty-four or forty-eight hours.

Prophylaxis.—Prevention of this disease requires a public education in the causative factors, which would aid in its eradication, by destroying the breeding places of mosquitoes. All the houses should be screened with a small mesh screen. Individuals in malarial districts should take at least two grains of quinine daily to prevent the disease. If every case of malaria could be isolated so as to prevent mosquitoes from becoming infected, we would soon eradicate the disease; for without infected mosquitoes there would be no malaria.

Yellow Fever

Definition.—Yellow fever is an infectious disease that is characterized by a toxemia, albuminuria, and a hemorrhage from the stomach.

Etiology.—The disease is caused by an unknown parasite that is transmitted by the stegomyia mosquito—(Aeds colopus).

Period of Incubation.—The period of incubation is from two to six days. The mosquito becomes infected during the first three days of the fever. In about twelve days after the mosquito is infected it can infect another individual and from two to six days after being bitten the symptoms develop.

Symptoms.—The disease begins with a chilly feeling and a rapid rise of temperature accompanied with nausea and vomiting and followed by a jaundice. The pulse is rarely above one hundred and begins to drop when the temperature rises. About the third day albumen appears in the urine and the vomitus is black in color (black vomit) due to the hemorrhage in the stomach.

Prophylaxis.—The only preventive measures are to destroy the breeding places of the stegomyia mosquito. The most important thing to do is to prevent yellow fever patients from being bitten by the mosquitoes. There are any number of these mos-

quitoes present; but they are harmless owing to the fact that there are no yellow fever patients to infect them.

Dengue

Definition.—Dengue is an acute infectious disease characterized by fever, chills and pain in the joints, which is followed by an eruption.

Etiology.—The cause of the disease is an ultramicroscopic organism, which is transmitted by the culex fatigans mosquito.

Period of Incubation.—The period of incubation is from three to five days.

Symptoms.—The symptoms come on suddenly with headache, cold sensations, aching of the joints, and fever. The temperature rises high to the fourth day, then goes to normal for two days, then the paroxysms occur. In a large number of cases a rash appears on the skin.

Prophylaxis.—The preventive measures are the same as for malaria and yellow fever, in protection of patients from mosquitoes and destroying mosquito breeding places.

Trypanosomiasis

Definition.—Sleeping sickness is a chronic disease characterized by weakness, lassitude and fever.

Etiology.—The cause of this disease is the Trypanosoma gambienese, which is transmitted by the tsetse fly (Glossina polpolis). This fly lives in bushes along the banks of lakes or rivers and feeds on the blood of crocodiles and antelopes.

Period of Incubation.—The period of incubation is variable; a long latent period takes place in man. The period of development in the fly is about twenty days and it remains infective for about seventy-five days.

Symptoms.—The disease usually begins with fever and dullness of mind, the gait soon becomes shuffling in character and the patient has a tremor of the tongue, hands and feet. They soon become drowsy and sleepy and death takes place early, usually from some infection as meningitis.

Prophylaxis.—The prevention of sleeping sickness depends on the isolation of cases and the protection against fly bites. The flies can not be destroyed, but the breeding places can be diminished by destroying the brush around streams, where they live.

Plague

Definition.—Plague is an infectious disease characterized by an involvement of the lymph glands and an inflammation of the lungs.

Etiology.—Plague is caused by a germ known as the Bacillus pestis, which is transmitted from rat to man by the flea. This disease is carried from place to place by infected rat fleas. The pneumonic form is very contagious and is spread from person to person.

Period of Incubation.—The period of incubation is not known.

Symptoms.—In the minor form there is a swelling of the glands of the groins and the patient may not be sick enough to seek medical attention. The bubonic type begins with a headache, the limbs soon become stiff, rise of temperature, which drops in four days, then a secondary rise, which is followed by a collapse and in the severe cases the patient dies. The septicemic type is very severe and the patient dies in three or four days. Pneumonic type begins with fever and a cough soon develops, with bloody sputum, accompanied with cyanosis and dyspnea; death occurs in from two to four days.

Prophylaxis.—All cases should be isolated, in a well-screened room, clothing and linen should be thoroughly disinfected, guarding against bites around infected regions. Nurses should protect themselves by wearing gowns and gauze masks and taking the prophylactic serum. All premises should be rid of rats. The most effective way is by means of traps. All ships should be fumigated before ar-

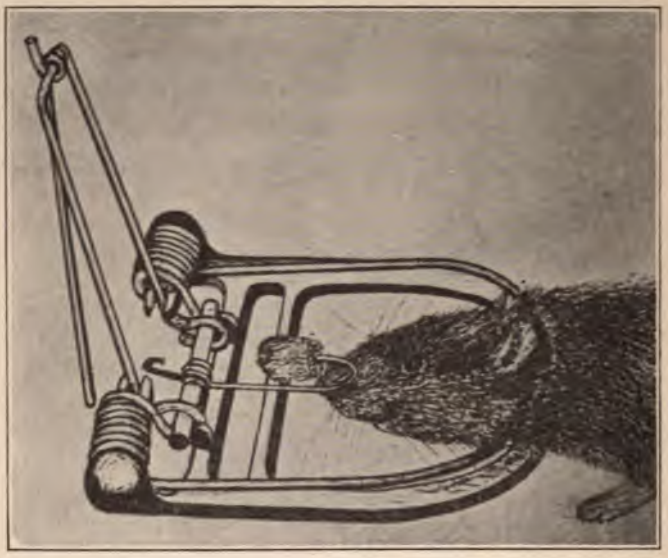

Fig. 47.—Method of baiting guillotine trap. (From Gardner.—*Practical Sanitation.*)

Fig. 48.—Barrel traps: 1, with stiff paper cover; 2, with hinged barrel cover; *a*, stop; *b*, baits. (From Gardner.—*Practical Sanitation.*)

riving in port in order to prevent infected rats from entering the port.

Rocky Mountain Spotted Fever

Definition.—Rocky Mountain spotted fever, or tick fever, is an infectious disease characterized by chills, fever, pain in the back and a hemorrhagic rash.

Etiology.—This disease occurs in the mountainous regions of Idaho, Nevada and Wyoming. The real parasite has not been determined; but is transmitted by the tick, which lives on horses and cattle.

Period of Incubation.—The period of incubation is from three to ten days.

Symptoms.—The disease usually begins with a chill, followed by fever and pain in the joints, from the second to the seventh day a rash appears, which soon becomes tinged with blood. The disease lasts about four weeks.

Prophylaxis.—Prevention of the disease consists in destroying the ticks, which is accomplished by dipping the animals that harbor the tick in a vat that contains oil or some solution that will destroy the tick. If an individual is bitten by a tick the bite should be cauterized with some strong antiseptic.

Typhus Fever

Definition.—Typhus fever is an acute infectious disease that is characterized by an abrupt onset, fever and a hemorrhagic rash.

Etiology.—The cause of this disease is an unknown virus which is transmitted by the body louse. The virus is taken into the blood and is thrown off by the lungs and the skin. The disease is associated with filth and unhygienic surroundings.

Period of Incubation.—The period of incubation is about twelve days.

Symptoms.—The disease begins suddenly with a chill, followed by fever and severe pains in the joints accompanied with vomiting. On the third or the fourth day an eruption appears on the chest and abdomen which resembles measles. The rash is at first rose-colored; later it becomes hemorrhagic. The fever rises until the fifth day when it reaches one hundred five or seven then it terminates with crisis.

Prophylaxis.—The prevention of the disease consists in eradicating the body louse, by burning infected clothing or boiling it and clipping the hair of the individual and giving a bichloride bath 1:5000.

Doctors and nurses should exercise great care not to touch objects in the room with their clothing. Gloves and veils should be worn and frequently

changed to see that no lice are present in them. The room should be fumigated after removing a patient.

Diseases That Are Caused by Physical Agents

1. Mountain sickness.
2. Sunstroke.
3. Caisson disease.

Definition.—Mountain sickness is a disease due to ascension to high altitudes, characterized by nausea, headache, and fainting.

Etiology.—The disease is due to the want of oxygen from lower atmospheric pressure. It occurs in individuals who have become adapted to low altitudes and in people who have some cardiac lesion.

Onset of the Disease.—The disease comes on suddenly after ascension.

Symptoms.—The first symptoms are those of nausea, headache, cyanosis and dyspnea. After the patient remains quiet awhile the symptoms disappear, but return on the slightest exertion.

Prophylaxis.—The prevention of the condition, is rest and gradual ascension until one become accustomed to the high altitude.

Sunstroke

Definition.—Sunstroke is a condition due to exposure to excessive heat and characterized by convulsions, coma and a high temperature.

Etiology.—This condition is caused by an excessive form of heat either from climate or engine rooms or any place where men are subject to high temperature.

Onset of Disease.—The disease comes on suddenly and the patient may die in an hour from the onset.

Symptoms.—The condition comes on with nausea, faintness, weak heart action. The patient soon becomes unconscious and has a cold, clamy skin, with a subnormal temperature. The temperature may go as high as 110° and the patient may die in from twenty-four to thirty-six hours.

Prophylaxis.—The prevention consists in protection from the sun's rays by shades and to endure extreme degrees of heat for short periods. Individuals who are exposed to high temperatures should wear porous clothing and the air in hot places should be kept in motion; for this promotes evaporation and helps one to stand a high degree of heat.

Caisson Disease

Definition.—Caisson disease is a disease that occurs in caisson workers and is characterized by severe abdominal pains and the "bends."

Etiology.—The condition is due to the saturation of the tissues with nitrogen and occurs in caisson workers and divers.

Onset of Disease.—The condition comes on from one-half to one hour after leaving the caisson.

Symptoms.—The disease begins with pain in the abdomen and legs, a bending of the body, "bends," dizziness and a paralysis of the legs. Death may occur suddenly.

Prophylaxis.—The men should be brought gradually from the caissons in order to let the tissue give off the nitrogen slowly. If the decompression is rapid some nitrogen will remain in the sluggish organs and can not be diluted.

The men should not stay in the caissons longer than two hours at a time.

Diseases That Can Be Prevented

1. Hydrophobia.
2. Opthalmia neonatorum.
3. Smallpox.
4. Tetanus.
5. Typhoid.

Hydrophobia

Definition.—Hydrophobia is an acute infectious disease communicated to man by the bite of animals.

Etiology.—The disease is caused by a virus, which is transmitted through the bite of rabid animals, as dogs, cats, wolves and horses. The virus

enters through the unbroken skin and travels along the nerve sheaths to the spinal cord and the medulla. This is responsible for the long incubation.

Period of Incubation.—The period of incubation in man varies from forty days to two months, or may go to two years. In the dog the incubation is from twenty to forty days.

Symptoms.—At first there is an irritation around the wound, and patient has increased sensibility to noise and excitement. There is a difficulty in swallowing, then comes the stage of excitement, in which the patient goes into spasms, from trivial things. Attempts to take water are very painful. This stage lasts about three days, then the patient becomes quiet and death may result in from six to eighteen hours.

Prophylaxis.—The prevention of this disease consists first in cauterization of the wound with nitric acid or a hot iron. Then the Pasteur treatment should be instituted, the treatment consists in injecting into patients the fixed virus, which has dried for fourteen days for the first dose and about three days for the last dose. This virus is obtained by injecting a rabbit from fourteen to twenty-one days, and another rabbit is inoculated from this one until the virulence is increased and the rabbit develops the symptoms in from six to seven days. The spinal

cord from these animals is removed and dried in a bottle of potassium hydroxide for fourteen days for the first dose, thirteen days for the second dose and so on until the cord has been dried three days for the last dose. The drying lessens the virulency. The treatment covers a period of about twenty-one days.

Opthalmia Neonatorum

Definition.—Opthalmia neonatorum is an inflammation of the conjuctiva of the newly born, which occurs shortly after birth.

Etiology.—This infection usually takes place, as the head passes through the vagina, or the infection may occur from the infected hands of the physician or the nurse, or by the use of unclean towels or dressings. The causative organism is the gonococcus, it may be caused by the pneumococcus or streptococcus.

Period of Incubation.—The period of incubation is any time after birth, usually before the end of the first month.

Symptoms.—The first symptom is a copious discharge from the lids, which is followed by swelling and chemosis. There may be ulceration, and sloughing of the cornea.

Prophylaxis.—Prevention of this condition means

prevention of a large number of cases of blindness. The prophylaxis consists in treating the eyes immediately after delivery. They should be first cleansed with sterile cotton or gauze using a separate piece for each eye. They should then be washed with a saturated solution of boric acid; then two drops of a 2 per cent solution of silver nitrate should be instilled into each eye (Crede's solution). The eye lids should be separated so that the solution comes in contact with every portion of the conjuctiva and great care should be taken that the eye is not injured in any way during the administration of the solution. A 25 per cent argyol solution can be substituted for the silver nitrate solution. The eyes should be cleansed daily with a saturated solution of boric acid and if one eye should show any sign of inflammation the other eye should be sealed in order to prevent infection. Twenty-five to thirty per cent of all blindness is due to this disease.

Smallpox

Definition.—Smallpox is an infectious disease that is characterized by an eruption, which goes through four stages, papule, vesicle, pustule, and crust.

Etiology.—This disease is caused by protozoan-like bodies, which are transmitted through the air from the dried crust of patients, the secretions of the

nose and throat or from personal contact. The disease is contagious from its earliest stage.

Period of Incubation.—The period of incubation is from nine to fifteen days.

Symptoms.—The disease usually begins with a chill followed by a headache, vomiting and high fever which drops on the fourth day when a bright red papular rash appears. On the next, or fifth day, the papules change to clear like blisters or vesicles. On the eighth day the vesicles change to pustules and the temperature rises again and on the tenth day the pustules dry to form crusts.

Prophylaxis.—All cases should be isolated in a well ventilated room. Nurses should wear caps and gowns while in the room. All dishes should be boiled before leaving the room and all food that is left should be burned and not carried out of the room. Linen and clothing should be immersed in a 1:1000 bichloride solution and the urine and feces should be disinfected. The patient should be thoroughly cleansed with soap and water before dismissal. The prevention of this disease consists in vaccination, which is usually done during the school age.

Tetanus

Definition.—Tetanus or lockjaw is an infectious disease that is characterized intermittent tonic spasms of the muscles.

Etiology.—This disease is caused by the tetanus bacillus which gains its entrance through punctured and lacerated wounds, that come in contact with the soil where these germs grow. They multiply in the intestinal tract of the horse and cow and are passed on to the soil where they remain. They will not grow in the presence of oxygen.

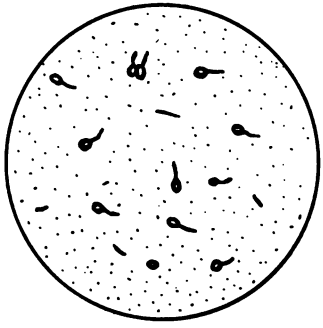

Fig. 49.—Tetanus bacilli.

Period of Incubation.—The period of incubation is from one to twenty days.

Symptoms.—The disease usually begins with a slight stiffness of the muscles of the neck and the jaw. Tonic spasms come on from the slightest disturbance, at intermittent intervals. The head may be drawn back and the patient unable to open the mouth.

Prophylaxis.—The prevention consists in treating all punctured and lacerated wounds locally with

tincture of iodine and the administration of tetanus antitoxin in all suspicious cases, such as gunshot wounds and Fourth of July accidents and wounds that are received while working around horses.

Typhoid Fever

Typhoid fever was considered under the heading of diseases conveyed by the alimentary discharges and is prevented by inoculation with typhoid vaccine.

Diseases That Are Transmitted by Inoculation

1. Gonorrhea.
2. Syphilis.
3. Chancroid.

Gonorrhea

Definition.—Gonorrhea is an acute infection that is characterized by a whitish discharge from the urethra or the vagina in the female and accompanied with a burning sensation on urination.

Etiology.—The disease is caused by a biscuit-shaped germ known as the diplococcus of Neisser and it is spread by sexual intercourse. In young children the disease is spread by accidental infection such as using some contaminated article or clothing that has been used by a person suffering from the disease. The disease is quite frequently seen in young children due to sexual intercourse especially in the colored race; this is due to the fact that there is a superstition that one suffering from

this disease will be cured if they have sexual contact with a virgin and the result is that young children are used for the purpose.

Period of Incubation.—The period of incubation is from one to fourteen days.

Symptoms.—In the male there is first an itching about the urethra, with the appearance of a whitish discharge accompanied with a burning sen-

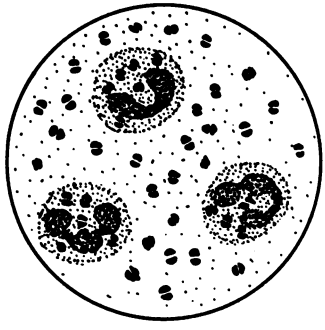

Fig. 50.—Gonococcus.

sation on urination. The discharge soon becomes yellow in color and there is usually a backache and a feeling of malaise. In the female the first symptoms are irritation around the vulva, with a profuse vaginal discharge and a painful urination. If the infection extends up the uterus and out to the tubes it will cause a pelvic peritonitis with all its manifestations.

Syphilis

Definition.—Syphilis is a specific disease which passes through three stages and is characterized by an initial sore or rash and by varied clinical manifestations.

Etiology.—The disease is caused by a germ known as the Treponema pallidum, which was discovered

Fig. 51.—Spirocheta pallida.

by Schaudinn in 1905. The disease is transmitted by sexual intercourse, kissing, and using infected towels, cups, etc. It may be transmitted accidentally to physicians and nurses from working with syphilitic patients. The disease is transmitted through the placenta and infects the fetus and in this way causes congenital syphilis.

Period of Incubation.—The period of incubation for the primary stage is from six to twelve weeks.

Secondary stage is about three months after the initial sore. The tertiary stage may occur at any time or it may never occur.

Fig. 52.—Chancre of lip. (From Sutton.—*Diseases of the Skin.*)

Fig. 53.—Chancre of face following bite. (From Sutton.—*Diseases of the Skin.*)

Symptoms.—The primary stage of the disease begins as a small red papule, which breaks down in the

Fig. 54.—Pustulosquamous syphilide. (From Sutton.—*Diseases of the Skin.*)

center and forms an ulcer that soon becomes indurated (hard chancre). In the secondary stage there

is some fever with an appearance of a brownish rash over the body and a swelling of the glands of the neck and the groin. Small ulcers appear in the mouth (mucous patches) the hair may fall out.

Fig. 55.—Ulcerating gummous syphilide. (Fox, Howard: Palmer Syphilides, Am. Jour. Syph., 1917, i, No. 2.)

The tertiary stage is marked by various manifestations, there may be a destruction of tissue or ulcers with no tendency to heal; or there may be a gummatous formation. On the other hand, the individual may suffer from one of the various nervous manifestations as tabes dorsalis, etc. This stage comes on

late, a good many years after the individual has had the primary lesion.

Chancroid

Definition.—Chancroid is a local lesion, which is characterized by its tendency to spread by inoculation of surrounding tissue.

Etiology.—The disease is caused by a thick dumb-bell-shaped organism, known as the bacillus of Ducrey and is transmitted by the genitals and rarely by any other means.

Period of Incubation.—The period of incubation is from one to ten days.

Symptoms.—The lesion is first red and soon forms a pustule that breaks down and forms an ulcer that produces a like lesion on any surface where there is an abrasion.

Veneral Prophylaxis

As these diseases are transmitted largely through sexual intercourse, the prophylaxis depends upon the education of each individual in the danger and the result of these various diseases. The education should begin early in life and both sexes should be taught that the function of the sexual organs is for reproduction and growth of the body. It must be impressed on young adults that dreadful diseases

are conveyed by the sexual organs and they must abstain from sexual intercourse until marriage.

The sexual appetite is the strongest desire possessed by man, so that all forms of temptation for both sexes who are going into puberty should be avoided.

Constant association with the opposite sex as in swimming or in places where young people are unchaperoned has a tendency to arouse the sexual desire. The lure of alcohol, association with bad companions, reading vile literature, looking at indecent pictures, will have their influence in arousing a dominant desire. Perhaps the greatest lesson that can be taught is continence, which is compatible with health, for exercise of the sexual organs is not necessary for the health of the individual as has been taught. In fact, the best physical efficiency is obtained when the sexual organs are not used. Nightly emission should not alarm any one, for it is only natures means of taking care of a physiologic process and does not signify that the individual is in need of sexual intercourse as is commonly believed by many young men.

The sexual appetite may become stimulated in early life in both sexes from companionship and they may be ignorant of the fact until the desire is satisfied and in this way they drift into a life that sooner or later leads to one of the veneral perils. Many young men are ruined by falling victims of

the lowest class of women from the fact that the sexual desire is aroused in some way from association, or the freedom allowed them.

The growing youth should have plenty of outdoor exercise with good environments and proper mental training, with but few idle moments to spare; for an idle brain will ruin many a promising youth.

The medical prophylaxis is only carried out in the Army and the Navy, where they require the men to report after each sexual intercourse and they are given medical treatment for the prevention of these diseases. Any soldier who develops this disease without having first reported for inspection and received the prophylaxis is punished. A regular medical inspection is carried out at various intervals for the veneral diseases. In this way the number of cases has been greatly diminished.

CHAPTER V

IMMUNITY

Immunity is the ability one has to resist disease. It is divided into:

1. Natural Immunity, which is composed of the active and the passive forms.
2. Acquired Immunity.

Natural immunity is the power possessed by certain species to resist disease; for example, the lower animals are immune from venereal disease. Goats are immune from tuberculosis, and the negro is immune from yellow fever.

Acquired immunity is the specific resistance to infection that is acquired from having some disease (active), or from the introduction of some antitoxin into the body (passive). The former is active because the disease stimulates the cells of the body to form antibodies and thus produce immunity. The latter being the passive form, from the fact that the antibodies are formed outside of the body and are introduced into it. The protection of the body by immunity is brought about by the formation of antibodies.

Erlich explains immunity by his side chain the-

ory; that is, that every cell has receptors that take up food and toxic particles.

These receptors serve to unite the toxin to the cell. The toxin is composed of two parts; one that will

Fig. 56.—Cell with its receptors.

poison the cell (toxiphore) the other connects to the receptor (haptophore).

Two things happen, when this toxin unites with the cell, through the receptor; the cell either dies from it or it is stimulated to an overproduction of

Fig. 57.—Shows the two parts of a toxin, toxiphore and haptophore.

receptors, which soon loosen from the cell and float free in the blood stream.

These free receptors constitute the antitoxins; so that if a toxin is introduced into the body it will combine with a free receptor and be neutralized.

Another view is that the toxin is connected to the receptor by a substance that is present in the blood and has the power of dissolving bacteria and cells.

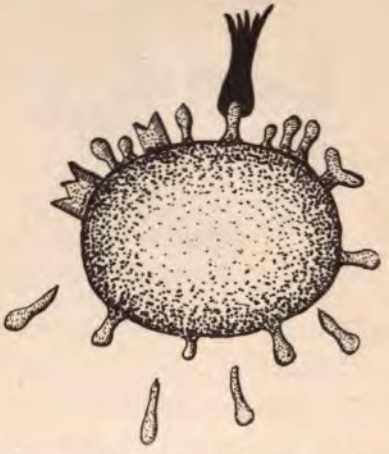

Fig. 58.—Toxin anchored to cell, some are thrown off.

Fig. 59.—Toxin neutralized by antitoxin or receptor.

It is known as the complement. It fixes the toxin to the receptor of the cell.

In the next or the third order of immunity, the

Fig. 60.—Showing the complement fixing the toxin to the receptor of the cell.

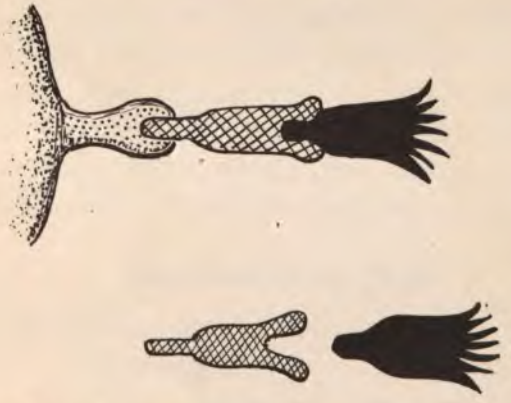

Fig. 61.—Bacteria connected to receptor by complement and toxin.

cell fixes the toxic material to the complement on one end and the toxin on the other end of it and in this way act on it.

The body is also protected by means of the unbroken skin, gastric juice, white blood cells and healthy mucous membranes.

In some instances foreign proteins that are injected into the body hypodermatically or intravenously, produce antibodies, which give rise to serious symptoms that may be fatal. This phenomena is known as antiphylaxis.

CHAPTER VI

FOOD

Food may be defined as anything which supplies nourishment and energy to the body.

Owing to the fact that a number of diseases are transmitted through the medium of food, a large number of cities are enforcing public health laws, such as screening and keeping all public places in a sanitary condition, where all foods are handled. If all individuals who handle food were examined physically and the deficient eliminated, we should soon eradicate a large number of disease transmitters, if we choose to call them such. The tuberculous and the syphilitic should be eliminated from handling foods; still we find a large number of these individuals working in the best hotels or cafes. Food may injure health by being poisoned to the extent that an individual, might not be able to digest certain kinds of food or there may be some special kind that is poison to the system through the nature of the food itself, or through bacterial decomposition.

Classification of Foods

Foods may be classified as:

1. Starchy,

   As cereals, fruits and potatoes.

2. Oily,
   As butter, olive oil and fat meat.
3. Nitrogenous,
   As lean meats, and the whites of eggs.
4. Condimental,
   As spices, pepper, mustard, etc.

Each one of these foods has its own function to perform in the economy, and either one of them can perform the function of the other in cases of emergency.

Uses of Foods.—The starchy foods, or carbohydrates, are used for their carbon and the production of energy.

The fats or oily foods, produce heat and are stored up for future use. The nitrogenous foods aid the starchy and oily foods and build up muscle and connective tissue. The condiments are used to flavor the food and to make it more palatable. To sum up the uses of food, we would say that it is used to build up the wasted tissues of the body and to supply it with energy. This energy is brought about or produced by the metabolism of food plus the oxygen; the latter being the fuel for the flame. This energy is measured by a unit known as a calorie, which is the amount of heat required to raise one gram of water from 0° to 1° C.

When individuals are fed scientifically they are given so many grams of food, with the view that each gram of food will liberate so many calories of heat. This is easily done by knowing how many calories will be liberated by every gram of the different foods, for example:

One gram of protein produces.....4.5 calories
One gram of carbohydrates produces.....4.5 calories
One gram of fat produces.....9.3 calories

It will be noticed from the above table that one gram of fat produces nearly twice as many calories as the carbohydrates and the proteins.

Amount of Food.—The amount of food varies with the individual as well as sex, occupation and climate; for example, we would expect people who endure cold weather as the Eskimoes to eat a large amount of fats on account of the heat production. A clerk or an individual who leads a sedentary life would not be expected to eat as much as an individual at manual labor, for the demands on the tissues are greater in manual labor than in other forms. A woman will not ordinarily eat as much as a man on account of the largeness of the tissues and the muscle development of the male, as well as the kind of work done by each.

Excessive Amount of Food.—Most individuals eat to much; a fact which is partly explained by having the food well cooked and highly seasoned. Over-

eating causes overwork of the digestive organs and through this they become enlarged. This enlargement predisposes to gout and obesity, with an enlargement of the liver, which might result in a fatty degeneration of the heart. The end results of overeating are malaise and fatigue, which are due to intestinal stasis and causes an absorption of poisons.

Insufficient Amount of Food.—Life is dependent on food and lasts from six to ten days when all foods are withheld. Some individuals have claimed to have fasted forty days without anything but water.

For the first two or three days of the fasting, hunger increases to extreme, with gnawing pains in the epigastrium, but it finally disappears, to reappear later. It has been shown that hunger pains go and come with the contraction of an empty stomach. Hunger is not a safe guide for food, for individuals who can not digest food are usually hungry. It has been shown that where famine occurred diseases of some kind usually followed, a fact which is explained by the lowered tissue vitality due to the lack of nourishment.

An insufficient amount of food might produce starvation or inanition, the former being an insufficient amount of food, the latter an insufficient assimilation of the food taken in the body.

Mixed Diet.—Mixed diet is the only rational diet

and perhaps the only safe one. Still the Chinese people live on an unbalanced diet and escape the various diseases of nutrition; while on the other hand, we find other people suffering from a number of diseases due to an unbalanced diet.

Pellagra has been proved to be a disease due to an unbalanced diet. Scurvy is another disease due to an unbalanced diet and was recognized among the sailors, who lived on salt and dried meats. At the present time fresh meats and fruits are carried on the ships and the disease is rarely seen. Rickets is a disease due to the lack of animal food, fresh juices and salts. Beriberi is a disease caused by eating polished rice.

Varieties of Food.—

1. Animal food.
   As meat, eggs, fish and milk.

2. Plant food.
   As rice, corn, oats, wheat and rye.

Composition and Nutritive Value of Meat.—The composition of meat is muscle, fatty tissue, blood vessels and nerves. It contains many albuminous and nitrogenous substances. The nutritive value depends on the presence of the nitrogenous part. When beef juice is made there is very little trace of it, showing there is very little nutrition in beef juice.

Sources of Meat.—Our principal source of meat is from cattle, sheep, hogs and wild game. The animals used for meat would be slaughtered in all the various diseased conditions were it not for our government inspectors, whose duty it is to make antemortem and postmortem examination of all slaughtered animals. Sometimes the flesh of immature calves is sold for meat. This is very undesirable food in many respects and has very little nutrition; it is known as "bob veal."

Eggs.—Eggs furnish about 3 per cent of the amount of food eaten and are very nutritious. The white consists of a large percentage of water, a small amount of nitrogenous matter and fat. The yolk is about half water and the rest is fat and a nitrogenous matter. Of all the foods eggs are less liable to convey disease; still they may contain bacteria and worms. No known disease is transmitted from the hen by her eggs.

Fish.—Fish, including oysters, clams and crabs are all used as a food to a great extent along the sea coast towns. These various forms of sea food may be contaminated before leaving the water or after removal and they have caused several epidemics at different intervals.

Milk.—Milk is a secretion obtained from the mammary glands. It is composed of water, proteins, fats,

sugar, enzyme cells and antibodies. The difference between woman's milk and cow's milk is very important and is given below, in the following table:

	CARBOHYDRATES	FATS	PROTEINS
Woman's milk	7%	4%	1.5%
Cow's milk	4.75%	4%	3.50%

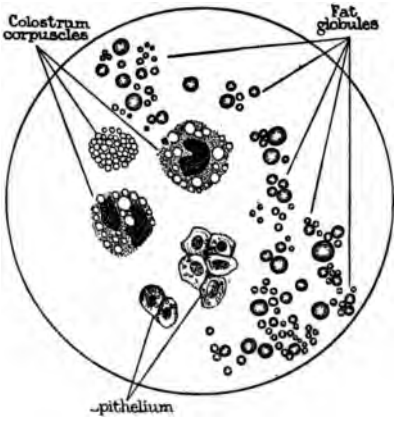

Fig. 62.—Elements of human milk. (From Reed.—*Obstetrics for Nurses.*)

There are several drugs excreted by the milk of a nursing woman if they are taken by mouth:

1. Calomel.
2. Aspirin.
3. Arsenic.
4. Opium.
5. Potassium bromide.

Milk proves to be so good a culture medium for bacteria that all rules of hygiene should be carried out, such as, good healthy cows and clean surroundings and clean utensils. The individuals who handle the milk should be clean and healthy, for a large number of epidemics have been traced to the handling of milk by unsanitary methods. A number of preservatives are added to milk and are very in-

Fig. 63.—A sample of the unsuspected but dangerous tuberculous cow. Rejected by the veterinarian after test. (From Gardner.—*Practical Sanitation.*)

jurious to health and are prohibited in some cities. The preservative consists of boracic acid, salicylic acid and formaldehyde.

Diseases Transmitted by Food.—Milk spreads a number of diseases and as a rule becomes infected

from human beings, in handling or in transportation, or the disease may be transmitted from the cow. The

Fig. 64.—Immaculate milking conditions. (From Gardner.—*Practical Sanitation.*)

more common diseases that are transmitted by milk are:

1. **Typhoid fever.**
2. **Tuberculosis.**
3. **Diphtheria.**
4. **Scarlet fever.**
5. **Summer diarrhea in children.**
6. **Malta fever, which is transmitted through goat's milk and the causative organism is the micrococcus melitensis.**

Meat transmits such diseases as trichinosis, tenia solium, tenia saginata, diabothriocephalus latus and septic infections. Trichinosis is a disease transmitted by pork. Rats are responsible for the disease being transmitted to man. They become infected around a slaughter house and are eaten by hogs, which transmits the disease to man, the eggs are imbedded in the muscular tissue of the animal and when eaten are set free in the stomach. Tenia solium is the pork tapeworm and is caused by eating the eggs in the infected meat. Tenia saginata is the beef tapeworm and is the most prevalent of the tapeworms. Diabothriocephalus latus is the tapeworm of the fish and is found especially in the perch.

Plant foods transmit such diseases as pellagra, beriberi and mushroom poisoning.

Preservation of Food.—Preservation of food is a process whereby food is kept for future use, without decomposition or putrefaction.

The decomposition and putrefaction of food is dependent on bacteria that invade the food through the medium of the air. Their growth being favorable in heat and moisture, therefore certain foods as milk and tomatoes would rapidly decompose in warm weather. The art of preservation of food falls back to our knowledge of bacteriology and chemistry, where certain chemicals or a definite process is used whereby the food can be preserved almost indefinitely without injuring the nutritive value of it.

Methods of Preservation

1. Chemical means:
    1. Table salt.
    2. Borax.
    3. Boric acid.
    4. Salicylic acid.
    5. Formaldehyde.

2. Mechanical means:
    1. Exposure to cold.
    2. Drying.
    3. Exclusion of air (canning).

Salt is one of the oldest preservations known and is perhaps the least harmful of all the preservatives. The rationale being that the salt dissolves out certain juices and leaves the fibers hardened, which preserves the food and only slightly impairs the nutri-

[illegible]

[illegible]

[illegible] poisoning [illegible]

[illegible] certain [illegible]

[illegible] and [illegible] himself [illegible]

[illegible] freezing [illegible] known [illegible] temperature. [illegible] this [illegible] moles and [illegible] temperature. If there [illegible] will settle on [illegible] there will be condi- [illegible] This is impor- [illegible] should not [illegible] stated the temperature [illegible] above 7° C.

Drying is an old process and a very satisfactory one, owing to the fact that it is done by sunlight, and dryness and sunlight are prejudicial to the growth of bacteria. One of these is the tubercle bacillus. Such foods as fruits and meat and milk are preserved by this method.

Exclusion of air is a very good method and is done in several different ways. The most common one used is to put the food in tin cans and to seal them with solder, the food being heated before entire closure of the can. Another plan is to cover the food with a heavy oil or to put on a coat of paraffin. Heating the food and boiling for a number of minutes and then putting it up in glass jars that are sealed air tight is one of the safest methods; for in this we have complete sterilization, with no danger of poisoning from tin, that comes in contact with the acid food.

Adulteration.—By adulteration is meant any foreign substance that is added to the food and does not form a part of it other than a flavor. This may be practiced for fraudulent purposes or for weight. It was extensively practiced until the passage of the pure food law. Foods that are adulterated are substances such as lard and butter, cottonseed oil being added to them and in some cases substituted for the product itself.

CHAPTER VII

WATER

Water is the prime necessity of life, which has been proved by individuals fasting for long periods with only water. Water has for many centuries been considered as the most important factor to the population of a community; for around it large cities have been built and thousands of dollars have been expended yearly for the upkeep of a good water supply. If you recall from ancient history the construction of the great Appian aqueduct that carried water to Rome, with the other aqueducts that were built after this for the purpose of carrying water to places where it was not available and the time, labor and expenditure in maintaining these water structures, the importance of good water will be more forcibly impressed.

Sources of Water.—We have a cycle in the source or in the formation of water as in other things. Water comes to us from rain and snow, it is spilled upon the earth's surface where some of it penetrates the soil and some of it is taken up by evaporation and is returned to the original source where it again falls to earth.

Kinds of Water.—

1. Rain water.
2. Artesian, or deep well water.
3. Well water.
4. Spring water.
5. River water.
6. Lake and pond water.
7. Sea water.

Rain water is the purest form of water, for it has gone through a certain process of distillation. It absorbs impurities as it falls to earth and is changed somewhat in composition, according to the atmosphere through which it has passed. It contains oxygen, nitrogen, sodium chloride, sulphuric acid, nitric acid and some organic matter. Rain water has not been successfully used for drinking purposes, despite its purity, which is due to the manner of collecting and storing it.

Artesian water is from very deep wells and usually furnishes pure water, due to the deep filtration through the soil it usually contains minerals as iron, etc.

Well water is the water from a hole in the ground to a supply. It is easily polluted from the surface by improper location, drainage and soil permeability.

Spring water is rain water that has been absorbed by the soil, it is considered pure when the water

flows out where it can be easily utilized. Springs are very dangerous if they are so located that they cannot be protected from surface pollution. The kind of

Fig. 65.—Note the danger to water supply and the possibilities of fly and mosquito infection from this example.—(From Gardner,—*Practical Sanitation.*)

water obtained from a spring depends on the soil and the climate.

River water is derived from rainfall and from soil drainage of the country. Rivers furnish large cities with their water supply as well as receive the sewage from the cities.

Fig. 66.—This open ditch is full of sewage and menaces all nearby water supplies. (After Gardner.—*Practical Sanitation.*)

Lakes are more desirable than rivers if they are kept from contamination, for the water is very soft and varies in composition. The Great Lakes receive sewage as well as furnish the water supply to some of the large cities. This is arranged by taking the water from the deep level of the lake for drinking purposes, where there is less chance for contamination.

Ponds are artificial basins built to hold water that is obtained during the wet season, for use during the dry season.

Composition of Water.—Water is a clear transparent, odorless, colorless fluid and is one of the best known solvents. It consists of one part of oxygen

Fig. 67.—A sanitary crime. (From Gardner.—*Practical Sanitation.*)

and two parts of hydrogen. It contains bacteria, various forms of algai, fungi, and, in some instances, various forms of minerals.

Uses of water.—It may be said that water is a food for the tissues of the body, for one-half of the body is composed of water. Its chief uses are:

1. It regulates the body temperature by absorption.

2. It dilutes the fluids of the body as lymph and blood.

3. It goes into tissue formation.

Diseases That Are Transmitted by Water.—

1. Typhoid fever.
2. Cholera.
3. Dysentery.

Purification of Water.—Water is purified by chemicals, filters, etc. In running streams the purification is accomplished by oxidization. The water comes in contact with the oxygen in the air so that the organic matter is oxidized.

CHAPTER VIII

AIR

Composition.—Air is a mixture of gases which show uniformity over the earth's surface and has the following composition:

Oxygen	20.09%
Nitrogen	78.09%
Carbon dioxide	.03%
Argon	.94%

There are also slight traces of ammonia, oxone, hydrogen and hydrogen peroxide found in the air.

There is a marked change in the air after it is taken into the body. We have a reduction of the oxygen, with an increase in the carbon dioxide, while the nitrogen remains practically the same.

Difference Between Inspired and Expired Air

	Oxygen	Nitrogen	Carbon
Inspired air	20.18%	79.15%	0.03%
Expired air	16.033%	79.55%	4.38%

Oxygen is derived from plants and it sustains all life. There is a constant exchange between animal and plant life. The animals throw off carbon dioxide, which is taken up by the plant and some of it is converted into oxygen, which is thrown off and is taken up by the animals.

What happens when oxygen is taken into our lungs? It is absorbed by the lungs and passes into the blood stream, where it is carried by the erythrocytes to the various cells of the body. It is then oxidized or used up by the cells and converted into carbon dioxide. The bright red color of the blood is due to the oxygen combining with the hemoglobin and forming oxyhemoglobin. This is well illustrated in arterial blood. Venous blood is of a darker color due to the lack of oxygen and an increase of the carbon dioxide. Oxygen is also found in small quantities in the saliva, urine, and the bile. The amount that is absorbed is about two pounds daily for a healthy adult.

Nitrogen is inert and about the only purpose it serves in the combination is to dilute the oxygen and to regulate combustion. Nitrogen is very important in plant economy, for it can be fixed to the roots of certain plants by bacteria and serve them to a good purpose. All plants require nitrogen for their growth.

Carbon dioxide is derived from mineral springs oxidization of organic matter and by the chemical action of the soil and expired air. It is taken up by growing vegetation, which obtain carbon from it and some is converted into oxygen. About five hundred billion tons are discharged annually, but it is being constantly taken up by vegetation. It is estimated

that one acre of trees will draw about four and a half tons annually.

An individual in active exercise will produce about one cubic foot per hour and ten times as much is produced during violent exercise and in sleep. An ordinary gas jet will produce about three cubic feet per hour.

Bad effects from air are felt when carbon dioxide reaches two or three per cent. There is a noticeable increase in the depth and frequency of respiration at five per cent. Fainting takes place when the carbon dioxide content is then present, and when it finally reaches thirty per cent, there is headache, nausea and suffocation, and death usually takes place. Therefore it is necessary that the carbon dioxide percentage be held about right, or there may be some bad results. About ten volumes to ten thousand is safe for a room. The amount of carbon dioxide can be estimated by different forms of apparatus that are on the market, or by some simple chemical means. This is very important in the planning of ventilation of a building.

Temperature of the Air.—A vast amount of heat is absorbed from the sun, earth and expired air, which is given off at body temperature and therefore would warm the surrounding atmosphere in small quarters. The power of air to absorb and to store heat depends largely upon the amount of watery

vapor it contains or its humidity, as water is a great reservoir for heat. Therefore, when we have heat thrown off by the body we have an increase in the moisture and an accumulation of watery vapor, which interferes with the body evaporation. This is one explanation for sunstroke in humidity and high heat.

Humidity.—Humidity is the degree of moisture, which is perceptible to the eye or the touch, especially of that in the air. There are two kinds of humidity—relative and absolute. Relative humidity indicates the greatest amount of moisture the air could possibly contain at a given temperature. Absolute humidity indicates the amount of vapor actually present in the air. Complete saturation of the air is stated at one hundred. When the relative humidity reaches eighty per cent the moisture condenses and shows on our clothing or on the objects in a room. Humidity is lessened by altitude; the higher we go the less is the moisture, which is probably due to the cold air in the high altitude.

Relation of Moisture to Health.—Moist air is depressing, dry air is stimulating. This change is brought about by influencing the heat regulating centers. If we have more heat than is needed in the body it must be thrown off; if it is not thrown off sunstroke will result. If the body perspiration can evaporate freely this will not happen. Air above

88° F. becomes stagnated and evaporation can not compensate for the decrease in heat radiation and the result is an increase in the temperature of the body. Warm dry air is very stimulating and increases the evaporation from the body, but if the air is excessively dry it will cause serious trouble, for man is over half water (exact figures fifty-five and five-tenths per cent). Death usually results when the body is only half or one-fourth water.

The right temperature of a living room is about 68° F. If this is not warm enough the fault is due to a low humidity, which can be corrected by placing vessels filled with water about the room.

Fog.—When the watery vapor is condensed on dust particles we have a fog, which depends on the affinity the dust has for the moisture. The smoke from various manufactories in combination with the particles of carbon and ammonia favor fog formation, the blackness of the fog being dependent on the amount of carbon the fog contains. Fogs are very irritating and increase sickness by shutting off the sunlight and fresh air, as well as damage to clothing and other articles. It is estimated that in London the people suffer a loss of millions of dollars from fog formation yearly.

Impurities of the Air.—The impurities of the air constitute a large number of gases, as carbon dioxide, marsh gas, hydrogen sulphide, ammoniacal va-

pors, debris from animals, dust, smoke, organic matter thrown off the body, excreta and bacteria. Impure air is very prejudicial to health, because it lowers the vitality of the body, by not supplying the various cells of the body with enough oxygen.

Air-Borne Diseases.—We know that the number of air-borne diseases are few and that they are gradually diminishing from the list. We no longer see the Lister spray of carbolic acid in the operating room as was formerly used, when all infections were supposed to be due to the air. Malaria and yellow fever were formerly believed to be due to impure air arising from the swamps, but at present we know that it is due to the bite of certain mosquitoes. Smallpox and measles are still supposed to be transmitted by the air in a small radius.

CHAPTER IX

VENTILATION—HEATING

Ventilation

Ventilation is a process whereby fresh air is introduced into a room and the foul air is discharged. This is accomplished by several means, depending on the structure of the building and the number of occupants in it.

Ventilation is necessary from a standpoint of health, for a large number of people rush from their homes to their places of business, where they are confined all day, without enjoying fresh air, only that which comes in by the process of ventilation.

There is nothing more wholesome than a gentle draft. It may chill at first; but we soon get accustomed to it. The popular idea of catching cold from drafts, has some good arguments for and against it; but usually the draft only lowers the vitality of the individual, which renders him more susceptible to infection.

KINDS OF VENTILATION

1. Natural.
   - (a) Doors.
   - (b) Windows.
   - (c) Walls.
   - (d) Crevices.

2. Artificial.
   (a) Propulsion system.
   (b) Vacuum system.
   (c) A combination of the two above.

Natural Ventilation.—Natural ventilation is that amount of air that gets in in spite of us, and depends upon the direction of the wind; for the wind forces the air into the building through doors, crevices and windows. In passing over chimneys it will draw the impure air out. Doors and windows prove to be the most efficient means of ventilation.

A very good way to ventilate a room and conserve the heat is to insert a four or a six inch board under a window and leave a small opening for the entrance of air as shown in the accompanying illustration.

The top sash of the window should be lowered for the exit of impure air, which arises to the top of the room after it is heated.

Artificial Ventilation.—Artificial ventilation is purely a mechanical method and is used in large office buildings where natural ventilation can not be successfully carried out. This is accomplished by means of large pipes that lead to the various rooms of the building.

In the propulsion or the "plenum" system the air is forced into the room, while by the vacuum or the "abstraction" system the air is drawn out of the

room by means of a fan expelled outwards by means of shafts or pipes.

The best and most satisfactory method of mechani-

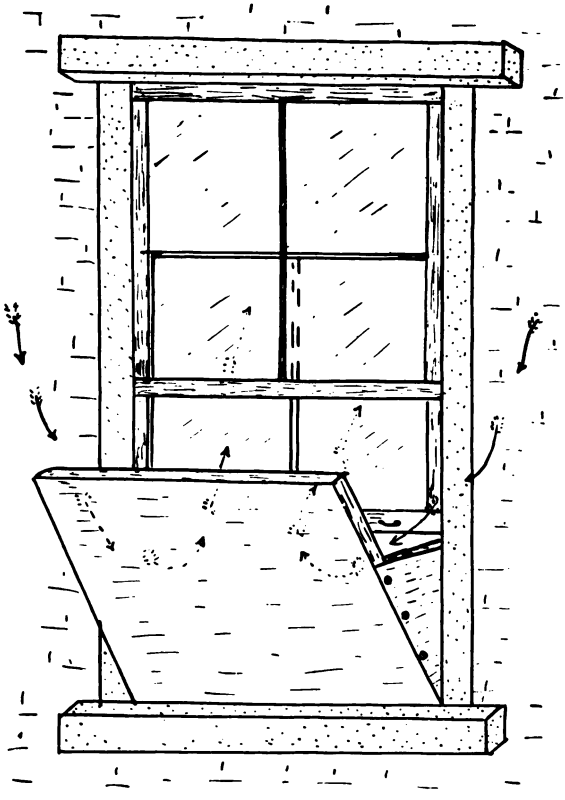

Fig. 68.—Board inserted for ventilation.

cal ventilation is a combination of the two above methods. The mechanical method of ventilation is advantageous over the natural method from the fact

that proper ventilation can be obtained regardless of the weather.

Heating

By heating we mean the production of energy, that gives a sensation of warmth to the body.

Regulation of Heat.—Heat is regulated by the body in a number of ways, such as clothing and muscular exercise. The skin plays an important part in the regulation of heat. When the external heat is high the sensory nerves of the skin carry messages to the motor nerves that control the sweat glands and stimulate them to activity, causing a perspiration to be poured out over the body. The oxidation of the food in the body produces a large amount of heat.

Conveyance of Heat.—This takes place in one of three ways:

1. Convection, which means that heat travels by the currents of air in a room.
2. Radiation, which means that heat may travel in a straight line from the sun to the earth.
3. Conduction, which means that the heat is transmitted along iron pipes.

Methods of Heating.—

1. By electricity.
2. By stoves.

3. Hot air furnaces.
4. Steam.
5. Fireplaces.

Electricity is a good clean way of heating, but it has not been extensively used, on account of the great expense.

Stoves are good for heating and they produce a good ventilation, as are the hot air furnaces which make them very desirable on the account of the pure air that is constantly being driven into the room by means of fans, etc.

Steam is used and allowed to circulate in radiators. Another good way is to use hot water in the radiators instead of steam, due to the economy and the upkeep of the machinery.

Fireplaces are very good from the ventilation that takes place through them.

CHAPTER X

DISINFECTION

By disinfection we mean the process by which bacteria are destroyed. This may be divided into:

1. Physical:
   Light.
   Heat.
   Gases.

2. Chemical:
   Gases.
   Liquids.

Light.—The rays of the sun prove a very good germicide and destroy such bacteria as bacilli of tuberculosis and typhoid fever. It also has good effect on sewage and drinking water. A good rule is to expose all furniture and bed linen to sunlight after infectious diseases.

Heat.—Heat is one of the best disinfectants and is employed in the dry and moist forms. In the dry form it takes a temperature 150 degrees for one hour to destroy the spores or eggs of bacteria. This is done by a special apparatus or sterilizer.

The moist form is applied by the use of special

easily procured; for it is put up in special fumigators for immediate use. Sulphur dioxide is more of an insecticide; but is a very good germicide. It bleaches articles of furniture and clothing in a room, but, on the other hand, is very cheap and easily used, by burning it in a room in special containers or in a pan or pot. Hydrocyanic acid gas is a very poisonous gas, it is used more for an insecticide in coaches, ships, stables, etc.

Liquid Disinfectants

1. Bichloride of mercury.
2. Carbolic acid.
3. Potassium permanganate.
4. Formalin.
5. Iodine.
6. Chlorinated lime and slacked lime.
7. Dakin-Carrel solution.

Bichloride.—Bichloride of mercury is one of our best germicides and perhaps is the one most used. It corrodes metals and is very poisonous and irritating to skin.

Carbolic Acid.—Carbolic acid is a good disinfectant, but will not kill the spores of bacteria and is used for linen and sputum.

Potassium Permanganate.—This is of good value in some cases due to the fact that it gives up its oxygen readily which is the disinfecting agent.

Formalin.—This consists of a 40 per cent solution of formaldehyde gas dissolved in water. It is very

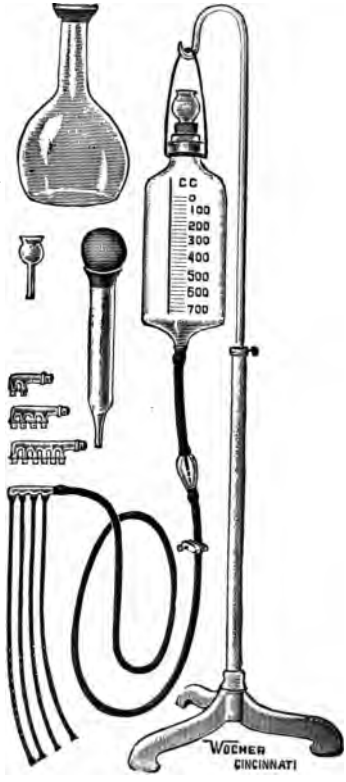

Fig. 70.—Dakin instrument employed in applying Dakin's solution to wounds. It consists of five glass distributing tubes for using single or large number of rubber conducting tubes, the flask is used for mixing the solution and the syringe with rubber bulb is used in testing the permeability of the conducting tubes. (From Barkley.—*Surgical and War Nursing.*)

irritating to the mucous membranes, therefore it is not so extensively used.

Iodine.—This is one of the best and most widely used. It is applied in the form of the tincture and used for disinfection of the skin.

Chlorinated and Slacked Lime.—This is the cheapest disinfectant we have. The activity of these substances depends upon the free chlorin.

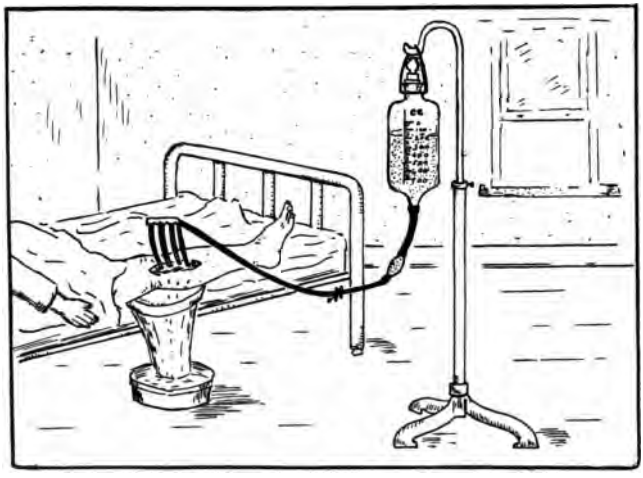

Fig. 71.—Apparatus devised by Dr. Carrel showing manner of irrigating wounds.

Dakin-Carrel Solution.—This consists of a mixture of sodium bicarbonate and chlorinated lime. The action depends on the liberation of free chlorine. It is used in the treatment of wounds that are received by instruments of war and is applied by special apparatus devised by Dr. Carrel.

Disinfection of Room.—The room should be so arranged that all articles will be exposed to the fumes. Closet doors should be opened and upholstered furniture or things that might become deeply infected should be treated separately. Carpets and rugs should be left in place until room is disinfected then treated with sunshine and air.

Windows should be closed and cracks or openings stopped with cotton, paper or cloth; then formaldehyde generator started and the room kept closed from twelve to twenty-four hours; then opened and aired.

Linen.—Body Linen or bed clothing, towels, etc., should be disinfected in all communicable diseases by either boiling or immersing in one of the following solutions: (1) 5 per cent carbolic acid. (2) 10 per cent formalin. (3) 1 to 1000 per cent bichloride solution. These should be soaked for at least two hours.

Excreta.—This is a common source for the spread of infection, therefore it becomes important to thoroughly disinfect it and protect it from flies and other insects.

If no chemicals are available the best thing to do is to put in a large kettle and boil it for one hour. Chemical disinfectants are: (1) 5 per cent carbolic acid equal parts of excreta keep in contact for 2 hours. (2) 10 per cent formalin thoroughly mixed

for one hour. (3) Chlorinated lime equal parts of this and excreta for two hours. (4) Milk of lime, use one part slacked lime to four parts of water and let stand one hour. Do not sprinkle lime over feces or, as is often done, use as much lime as excreta.

Sputum.—The best way to disinfect sputum is to burn it. It should be received in small paper cups that are covered and burned when full. The best chemical disinfectant is 10 per cent carbolic acid.

Thermometer.—This may be the source of spreading infections as it should be disinfected by a 10 per cent formalin, alcohol or bichloride solution. The bichloride will advance the figures of a thermometer. This can be prevented by putting a few drops of methylene blue in the solution (1 to 1000).

GLOSSARY

Al-bu-mi-nu'ri-a. The presence of albumin in the urine.

Al'ga. A group of fresh water plants including the seaweed.

Al'vine. Pertaining to the discharges of the intestines.

A-me'ba. A minute single celled organism.

An-ti-sep'tic. A substance that destroys or prevents the growth of bacteria.

An-thra-co'sis. Disease of the lungs in which there are small particles of coal dust lodged in them; seen in coal miners who inhale coal dust.

An-ti-tox'in. A substance prepared from the blood of some animal to be injected into another for the purpose of acting against some poison.

At-mos-pher'ic. Pertaining to the atmosphere.

At'ro-phy. A wasting or diminution of a part.

Bac-te'ri-a. Minute living, microscopic organisms, which appear as rods, spheres, and spirals.

Bends. A name for cassion's disease.

Ber'i-ber'i. A disorder characterized by inflammation of the nerves with muscular atrophy, due to the eating of polished rice.

Car-bo-hy'drate. Sugars and starches.

Car-ci-no'ma. A malignant tumor or cancer made up of epithelial cells.

Ca-tarrh'al. Pertaining to the inflammatory affection of any mucous membrane.

Che-mo'sis. A swelling of the tissues around the conjunctiva of the eye.

Co-los'trum. The first fluid secreted by the breasts after birth of the baby.

Con'di-ment. Anything used to give relish to food.

Con-gen'i-tal. Born with a person; something existing at or before birth.

Con-vul'sion. Violent contraction of the voluntary muscles.

Cor'ne-a. The transparent structure of the anterior surface of the eyeball.

Cri'sis. The turning point of a disease for good or bad.

Crust. Any outer layer.

Cy-a-no'sis. Blueness of the skin.

De-gen-er-a'tion. A change from a higher to a lower form.

Des-qua-ma'tion. The shedding of epithelial elements of the skin.

Dip-lo-coc'cus. Bacteria that are grouped in pairs.

Dysp-ne'a. Difficult or labored breathing.

En-u-re'sis. An involuntary discharge of urine.

En-vi'ron-ment. The surrounding influences or conditions.

Ep-i-dem'ic. A disease that attacks many people at the same time.

Ep-i-gas'tri-um. The upper part of the abdomen over the stomach.

Ep-i-lep'sy. A disease characterized by fits or attacks where there is loss of consciousness followed by tonic and clonic convulsions.

E-ruc-ta'tion. Belching or casting up wind from the stomach.

E-ryth'ro-cyte. A red blood cell.

E-ti-ol'o-gy. The causes of disease.

Ex-cre'ta. Waste material thrown off by the body.

Fe'brile. Pertaining to fever.

Fun'gi. A primary division of thallophytic plants including those destitute of chlororophyl and reproducing mainly by means of a sexual spores which are developed in various ways.

Gen'i-tal tract. Pertaining to the organs of generation or reproduction.

Ger'mi-cide. An agent that destroys germs.

Ges-ta'tion. Pregnancy.

Gon-or-rhe'a. A contagious inflammation of the genital mucous membrane.

Gout. Constitutional disease with inflammation of joints; cause: excess uric acid and urates in blood.

Gum'ma-tous. Of the nature of gumma.

Hem-o-phil'i-a. An abnormal tendency to hemorrhage.

He-red'i-ta-ry. Transmitting constitutional conditions from parent to offspring.

Hy-per-pla'sia. The abnormal increase in the elements of cells or tissue.

Hy-per-e'mi-a. Excess of blood to any part of body.

Im-be-cil'i-ty. Feebleness of mind.

In-cu-ba'tion. The period between the implanting of an infectious disease and its manifestation.

In-du-ra'ted. Hardened.

In-fan'ti-cide. The murder of an infant.

Im-mune'. Protected against any particular disease, as by inoculation.

In-sti-tu'tion-al-iz-ing. To put into institutions.

In-sec'ti-cide. Destructive to insects.

In-tra-ve'nous. Into a vein.

Kop'lik. Spots. Characteristic lesion found in mouth of one who has measles.

Lar'va. The first stage of insect development after leaving the egg.

Lac-ta'tion. The secretion of milk.

Lar'ynx. The organ of voice between the mouth and the upper part of windpipe.

Lac'er-at-ed. Torn.

Ma-laise'. Discomfort, distress.

Ma-lig'nant. Virulent, bad to worse.

Mam'ma-ry. Mammae or breast.

Me-dul'la. The deep or inner substance of an organ or part.

Men-in-gi'tis. Inflammation of meninges.

Me-tab'o-lism. The change produced in a substance by the action of a living cell.

Mi-cro-scop'ic. Visible by aid of a microscope.

Noc-tur'nal. Pertaining to the night.

O-bes'i-ty. Encumbrance of flesh.

O'vum. A female germ cell.

Oxy'hem-o-glob'in. Hemoglobin changed with oxygen in arterial blood.

Pap'ule. A small circumscribed elevation of skin.

Path-o-gen'ic. Causing disease or morbid symptoms.

Par'a-site. A plant or animal which lives upon or within a living organism.

Pel-lag'ra. Erythematous skin affection, with constitutional symptoms.

Per-i-to-ni'tis. Inflammation of peritoneum.

Pla-cen'ta. The after-birth.

Plas-mo'di-um. A multinucleated mass protoplasm.

Ple'num. A system of ventilation.

Preg'nant. With child.

Pre'puce. The foreskin covering the penis or clitoris.

Prog'e-ny. Race linage.

Pro-phy-lax'is. The prevention of disease; preventive treatment.

Pro'te-in. Constituents of all living cells.

Pro-to-zo'an. Of or pertaining to the protozoa.

Pu'ber-ty. The age at which reproductive organs functionate.

Py-e-li'tis. Inflammation of the pelvis of the kidney.

Re-ces'sive. Having a tendency to disappear.

Re-pro-duc'tive. Pertaining to the production of offspring.

Rick'ets. A constitutional disease of childhood, softening of bones.

Sal'i-va-ry. Pertaining to the saliva.

Scur'vy. A disease of the gums.

Sed'en-ta-ry. Pertaining to a sitting posture.

Sig'moid. Lower part of colon.

Sper-ma-to-zo'a. The motile generative element of the semen which serves to impregnate the ovum.

Spi-ro-che'ta Pal'lid-a. A spiral organism found in syphilitic sores.

Sta'sis. A stoppage of the flow of blood in any part.

Strep'to-coc-cus. A form of bacteria organisms.

Ta'bes. Any wasting of the body.

Te-na'cious. Holding fast, to retain.

Te'ni-a. A genus of tapeworm.

Ter'ti-a-ry. Third in order.

Trau'ma. A wound or injury.

U-re'thra. Canal conveying urine from bladder.

Var'i-cose. Unnatural swelling of vein.

Ver'nix Ca-se-o'sa. Cheesy substance that covers the fetus.

Ves'i-cle. A sack containing liquid, a blister.

INDEX

NAME	DATE DUE
D. Yocum	Mar. 13
H. Merchant	NOV 3 '22
	FEB 12 1926